Self-Study Programme 456

The Audi A8 ’10

Audi
Service Training

The Audi A8 ’10 combines excellent road holding with a high level of ride comfort and unique design.
The Audi A8 ’10, the sportiest of the luxury saloons, clearly stands apart from its core competitors, combining outstanding standards of comfort and prestige with a potentially irresistible appeal.
The Audi A8 is synonymous with the innovative Audi Space Frame (ASF) body concept, which has been systematically refined. An intelligent, modular front and rear Crash Management System fully absorbs the impact energy at low speed.
The occupants of the Audi A8 ’10 reside in an interior that exudes exclusivity and sporting elegance throughout, enhanced with a myriad of innovative details that underscore its progressive design and quality.
The engines of the Audi A8 ’10 and the eight-speed tiptronic have been developed specifically with a view to better fuel economy and lower CO_2 emissions combined with higher performance.

The Audi A8 ’10 is a beneficiary of the new design direction at Audi, which is based on the modular longitudinal platform principle. Key changes include the redesigned kinematics and elasto-kinematics, the set-forward front axle and reconfigured front axle components, the steering position under the centre of the front wheel and the upper control arm mounting integrated into the body.
The new light system and the numerous electronic control units arising from the increased use of infotainment systems have inspired groundbreaking new solutions in the Audi A8 ’10.
For instance, most of the control units are installed in the luggage compartment behind the rear seat system. A FlexRay bus system which controls data transfer by setting fixed transmission times has been integrated into the existing vehicle network.

The standard 2+2 zone automatic air conditioning system is based on a new air conditioner with 15 servomotors and allows separate climate control at head and foot level. The optional four-zone automatic air conditioning system also features a separate rear air conditioning system.

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The aims of this Self-Study Programme

This Self-Study Programme provides you with general information about the Audi A8 ’10. Once you have worked through this Self-Study Programme, you will be able to answer the following questions:

- From which material is the body B-post made?
- What is new about the car in terms of passive safety for pedestrians?
- What is the function behind the name Audi pre sense?
- What is the background to Innovative Thermal Management?
- Which new gearbox has been fitted?
- What is FlexRay?
- Which new driver assistance systems are available in the Audi A8 ’10?
- What are the new features of the air conditioning system in the Audi A8 ’10?
- What is so innovative about the third-generation MMI in the Audi A8 ’10?

Contents

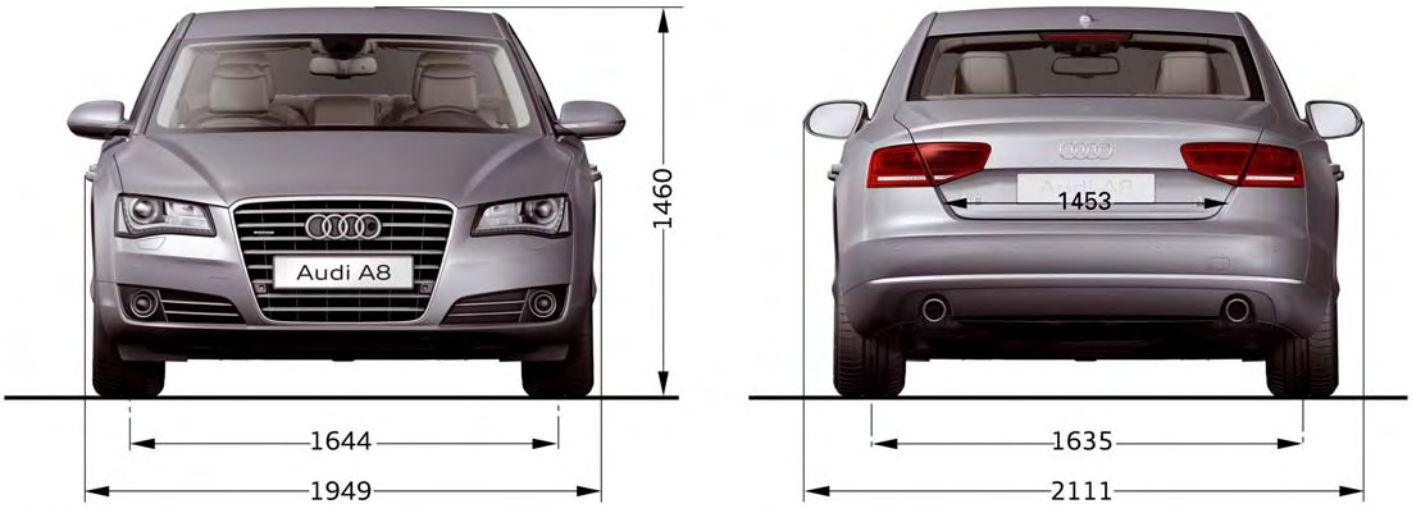
▸ The Self-Study Programme teaches basics of the design and function of new models, automotive components or technologies.
It is not a Repair Manual. Figures given are for guidance purposes only and refer to the software version valid at the time of preparation of the SSP.
For further information about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

Note

Reference

Introduction

Summary



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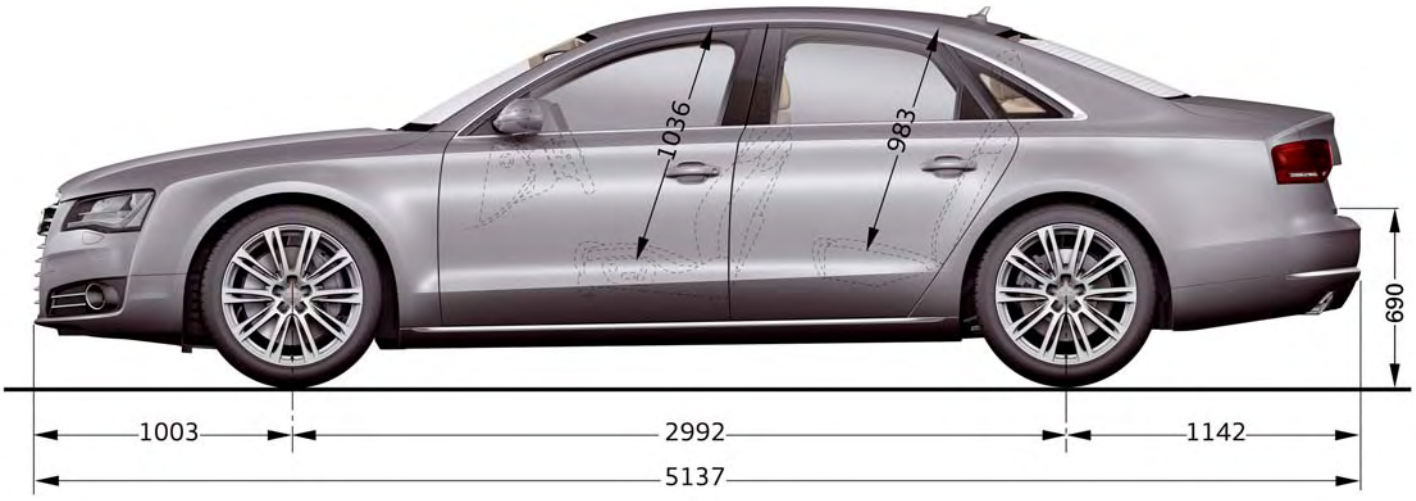

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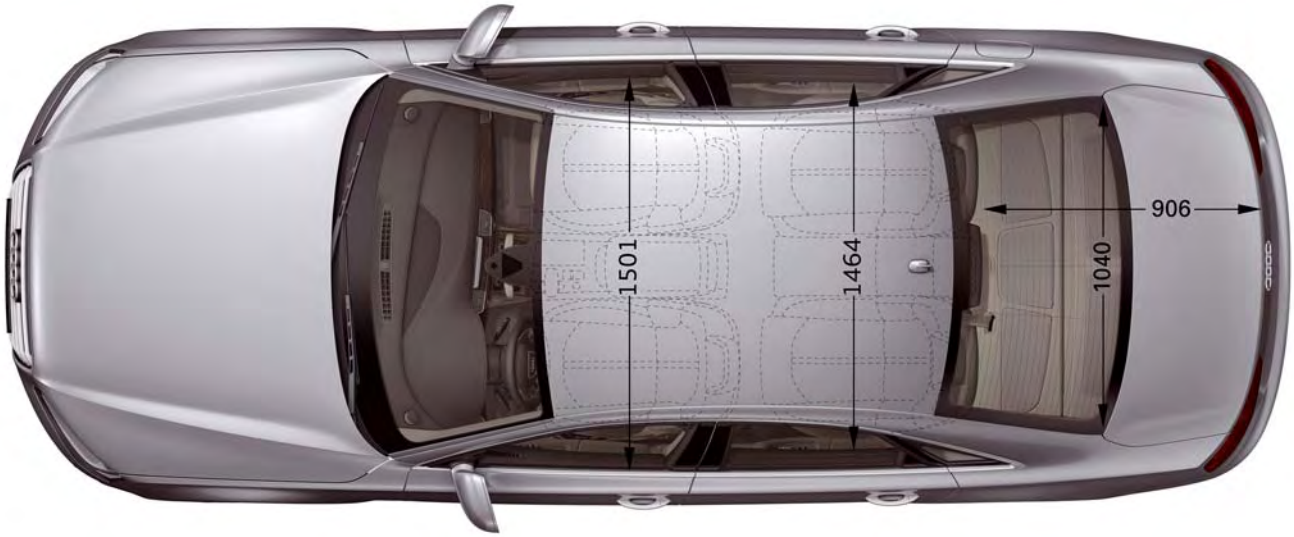

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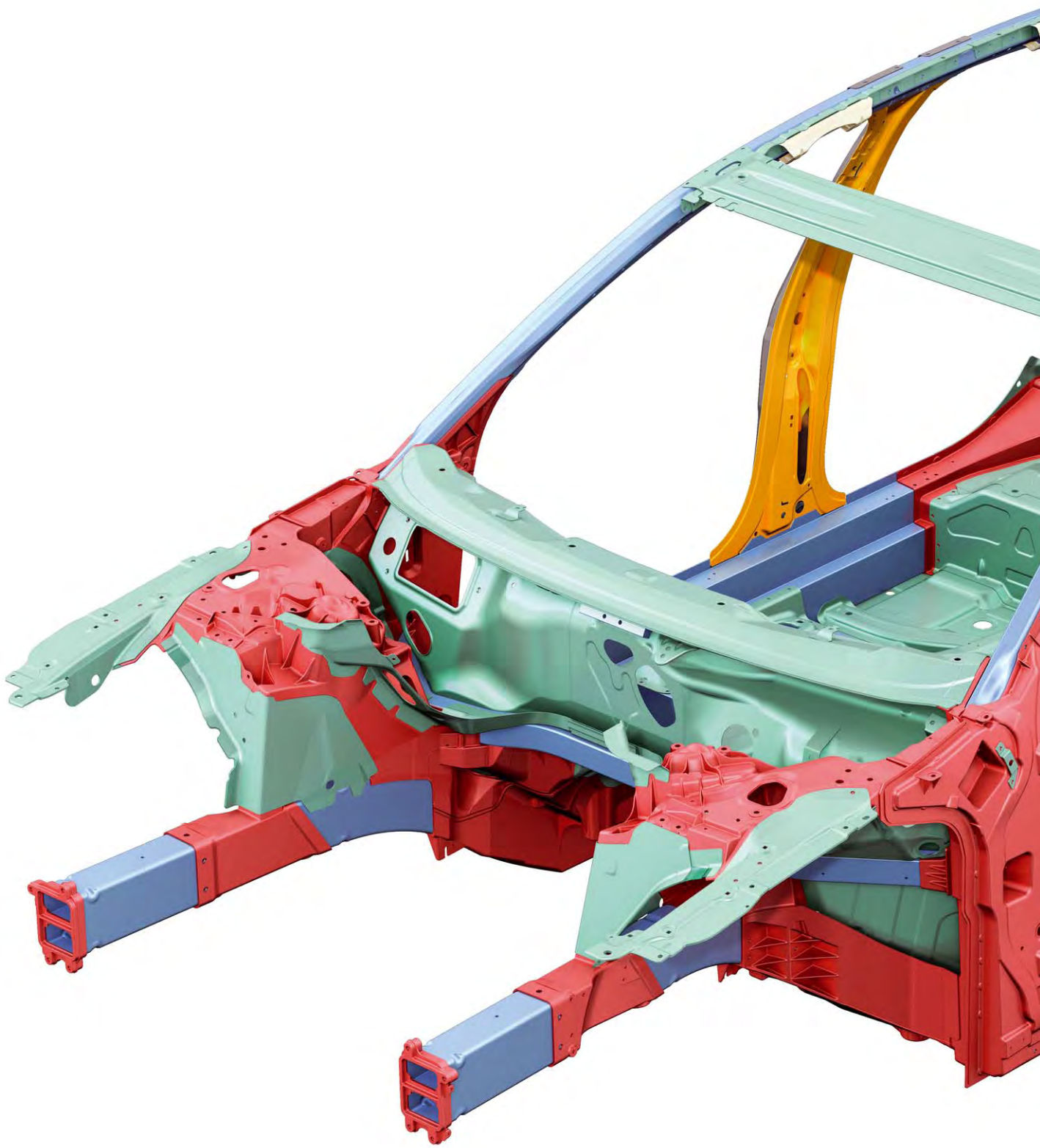
Length in mm	5137	**Internal width, front** in mm	1501
Width in mm	1949	**Internal width, rear** in mm	1464
Height in mm	1460	**Front headroom** in mm	1036
Front track width in mm	1644	**Rear headroom** in mm	983
Track width, rear in mm	1635	**Loading width** in mm	1453
Wheelbase in mm	2992	**Load sill height** in mm	690
Towing capacity in kg	750 / 2300	**Luggage capacity** in l	510
Kerb weight in kg	1835	**Fuel tank capacity** in l	90
Max. allowable gross weight in kg	2525	**Drag coefficient** in cw	0.26

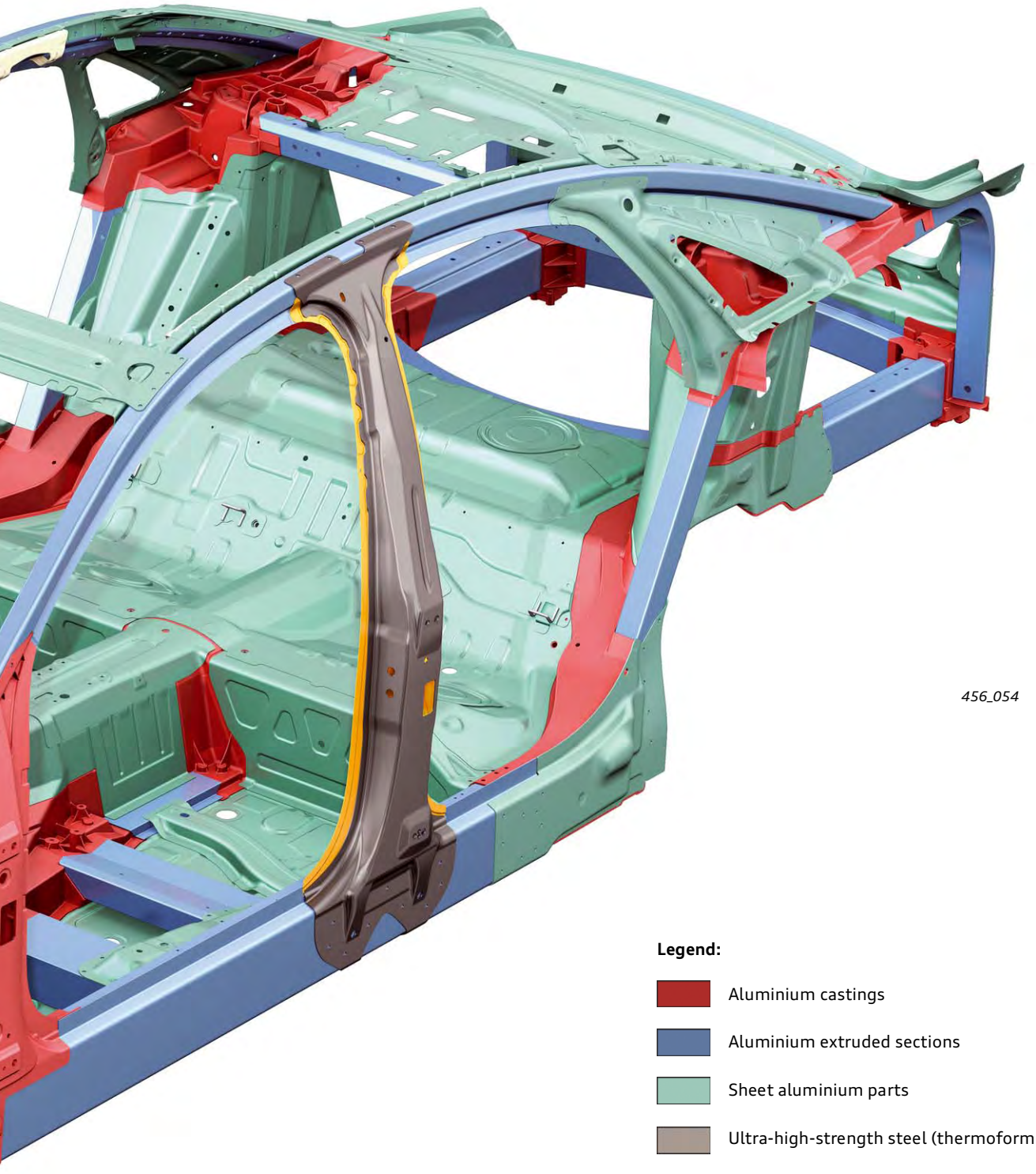
Body

ASF®-Karosserie des neuen Audi A8 ’10

The body of the Audi A8 ’10 continues the proven Aluminium Space Frame concept (ASF). Like in previous models, the structure is a composite of aluminium extruded sections, aluminium castings and sheet aluminium parts. A new feature is the steel B-post made from ultra-high-strength hot formed steel.

This design further enhances body rigidity and crash performance. High-strength aluminium panels and optimised large castings are other contributing factors. The body weighs considerably less than a comparable lightweight steel body, which would have been about 45 % heavier.





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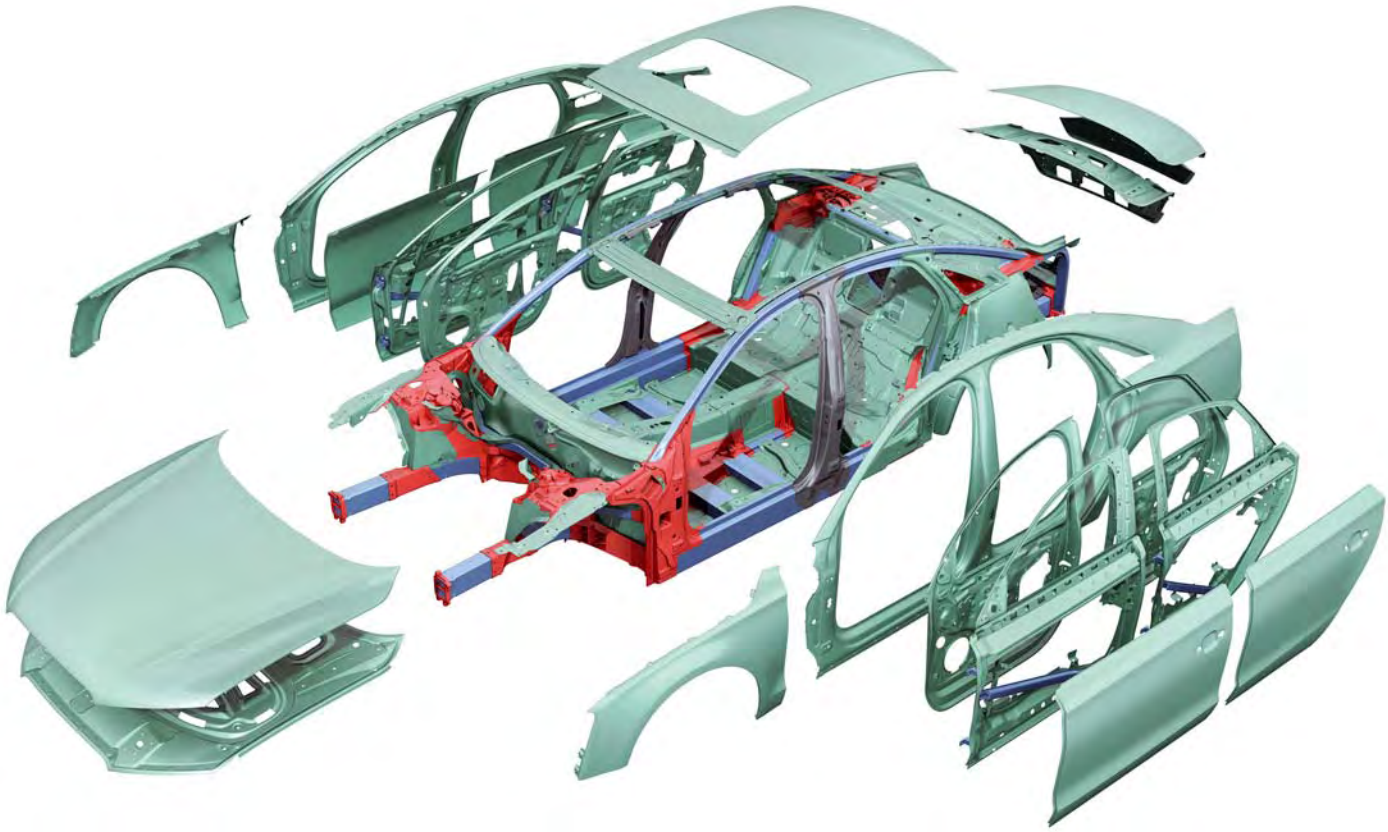
Legend:

- Aluminium castings
- Aluminium extruded sections
- Sheet aluminium parts
- Ultra-high-strength steel (thermoformed)
- Advanced High Strength Steel

Outer skin and attachments

All outer skin parts and attachments on the Audi A8 ’10 are made of aluminium. The door and window frames are of monoblock design and made of sheet aluminium (pressed solid doors).



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High-strength aluminium panels

High-strength aluminium panels reduce body weight and further increase strength in the tunnel area. In all, fifteen component parts of the Audi A8 ’10 body are manufactured from this high-strength aluminium alloy.

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B-post and B-post striker panel

The B-post in the Audi A8 ’10 is welded steel assembly, while the B-post itself is manufactured from ultra high tensile hot-formed steel and the striker panel from Advanced High Strength Steel.

If repairs are needed, the complete welded assembly is available as a genuine part.

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Attachment of B-post to body

The welded B-post assembly is attached to the body by Flow Drill Screwing. It is also bonded to increase strength and, in particular, to insulate the body and avoid contact corrosion.

The outer skin is attached to the B-post by bonding and punch riveting.

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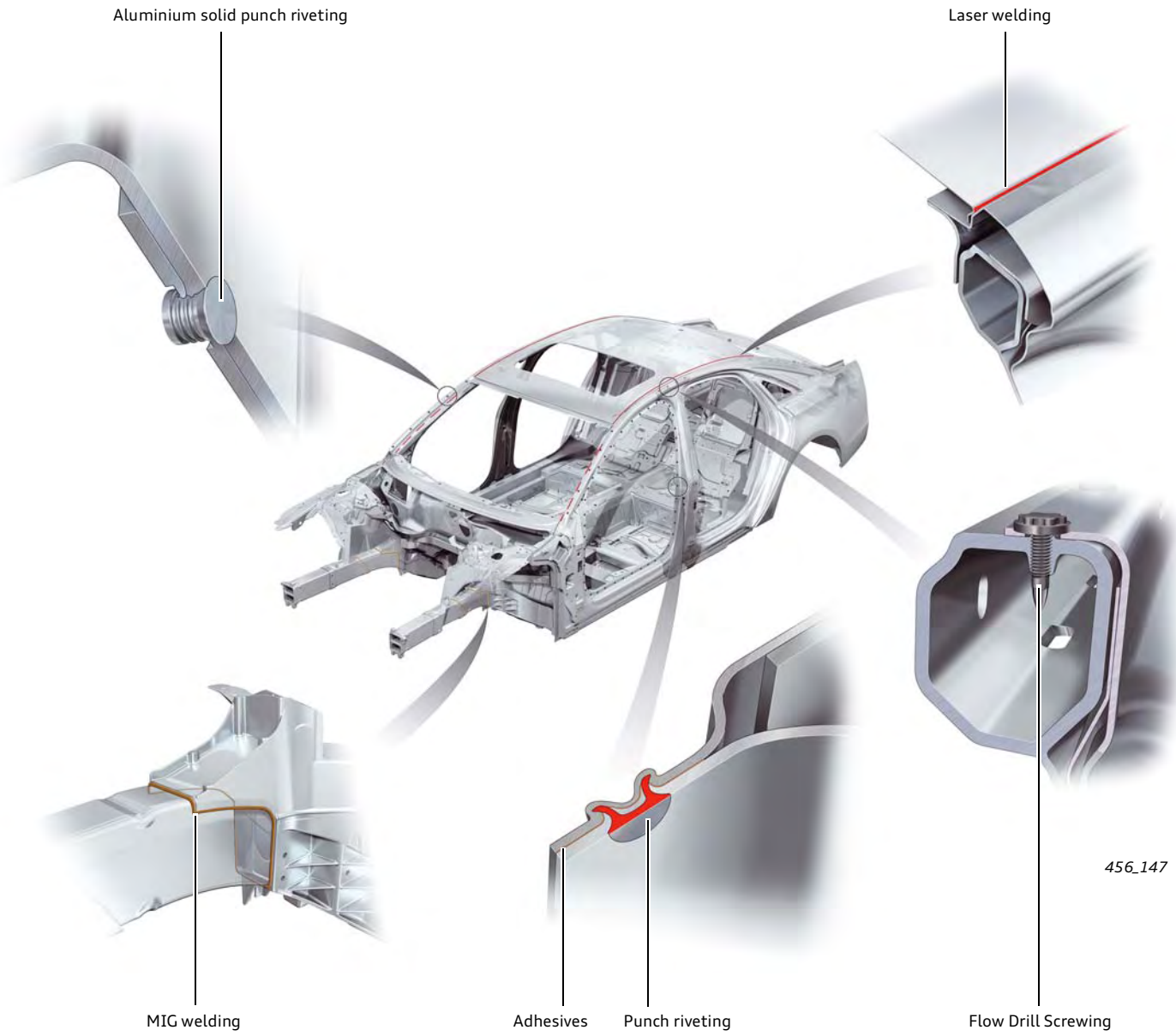
Joining techniques



The following proven joining techniques are used to join the body parts of the Audi A8 ’10:

- Metal Inert Gas (MIG) welding
- Laser welding (roof seam)
- Punch riveting (also used for joining the aluminium outer skin to the steel B-post)
- Flow Drill Screwing
- Solid punch riveting
- Clinching (attachments only)

Multifunctional large castings

Increased use is made of multifunctional large castings in the Audi A8 ’10. In particular, the A-post and the part connecting the underbar, sill and rear side member are larger than in the previous model and additionally serve to connect adjacent components. This also applies to the suspension strut mount.

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Bolting of side members

To facilitate the simple and inexpensive repair of a damaged front-end structure, the front part of the side member is bolted, like on previous models.

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Passive safety

Passive safety in the Audi A8 ’10

The Audi A8 family's proven concept of combining lightweight design with a high level of safety has again been consistently applied and implemented in the Audi A8 ’10.

The safety concept is based on the close interaction of driver assistance systems and the extensive use of passive restraint systems – providing added safety for the driver and occupants.

The occupant protection system in the Audi A8 ’10 comprises the following components and systems:

- Airbag control unit
- Adaptive driver and passenger airbags
- Side airbags, front and rear
- Head airbags
- Front airbag crash sensors
- Door-integrated crash sensors for side impact detection
- Crash sensors for side impact detection on the C posts
- Front inertia-reel seatbelts with electrical and pyrotechnic belt tensioners and active belt force limiters
- Rear inertia-reel seatbelts with pyrotechnic belt tensioners
- Battery isolator
- Seat belt reminder for driver and front passenger
- Seat belt switch, driver and front passenger side
- Seat occupied sensor in front passenger seat
- Driver and front passenger seat position sensors

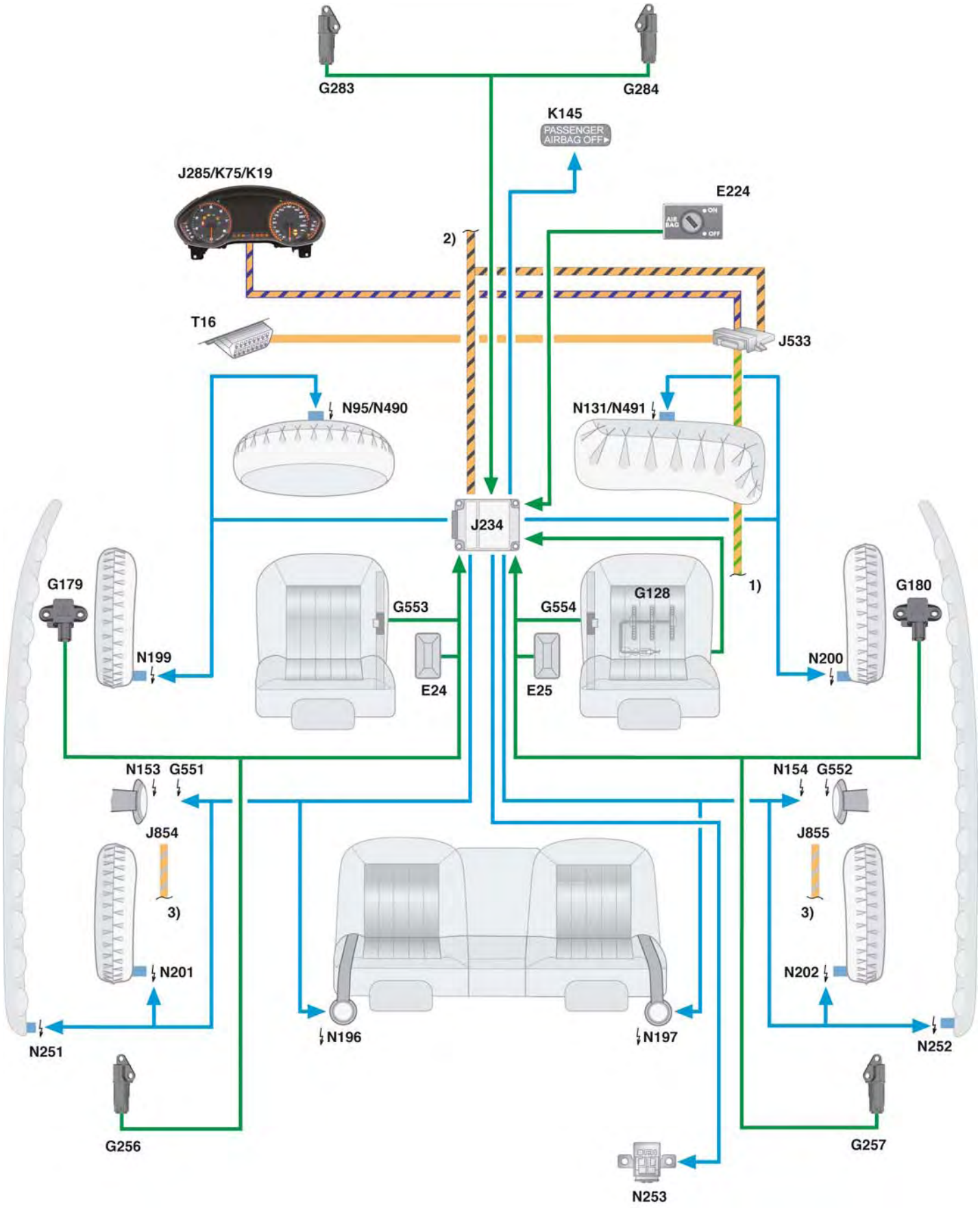
The vehicle is optionally available with a key switch for deactivating the passenger front airbag and an accompanying warning lamp.

Due to the different requirements and statutory regulations of markets with regard to vehicle manufacturers (and the US market in particular), equipment specifications can vary.

Legend:

E24 Belt switch, driver side
E25 Belt switch, front passenger side
E224 Airbag disabling key switch, front passenger side (optional)
G128 Seat occupied sensor, front passenger side
G179 Side airbag crash sensor, driver side (driver door)
G180 Side airbag crash sensor, front passenger side (passenger door)
G256 Rear side airbag crash sensor, driver side (C post)
G257 Rear side airbag crash sensor, passenger driver side (C post)
G283 Driver side front airbag crash sensor (left front end)
G284 Passenger side front airbag crash sensor (right front-end)
G551 Belt force limiter, driver side
G552 Belt force limiter, front passenger side
G553 Seat position sensor, driver side
G554 Seat position sensor, front passenger side
J234 Airbag control unit
J285 Control unit with display in dash panel insert
J533 Data bus diagnostic interface (Gateway)
J854 Front left belt tensioner control unit
J855 Front right belt tensioner control unit
K19 Seat belt warning system warning lamp
K75 Airbag warning lamp
K145 Passenger airbag OFF warning lamp (optional)
N95 Airbag igniter, driver side
N131 Passenger side airbag igniter 1
N153 Driver belt tensioner igniter 1
N154 Passenger belt tensioner igniter 1
N196 Rear belt tensioner igniter, driver side
N197 Rear belt tensioner igniter, front passenger side
N199 Side airbag igniter, driver side
N200 Side airbag igniter, front passenger side
N201 Rear side airbag igniter, driver side
N202 Rear side airbag igniter, front passenger side
N251 Driver side curtain airbag igniter
N252 Passenger side curtain airbag igniter
N490 Driver airbag discharge valve igniter
N491 Passenger airbag discharge valve igniter
N253 Battery isolation igniter
T16 connector 16 pin, diagnostic port

1) Convenience CAN
2) Powertrain CAN
3) CAN Extended


G283
G284
K145
PASSENGER AIRBAG OFF
J285/K75/K19
E224
AIR BAG
ON
OFF
2)
T16
J533
N95/N490
N131/N491
J234
1)
G179
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G553
G554
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N197
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N253

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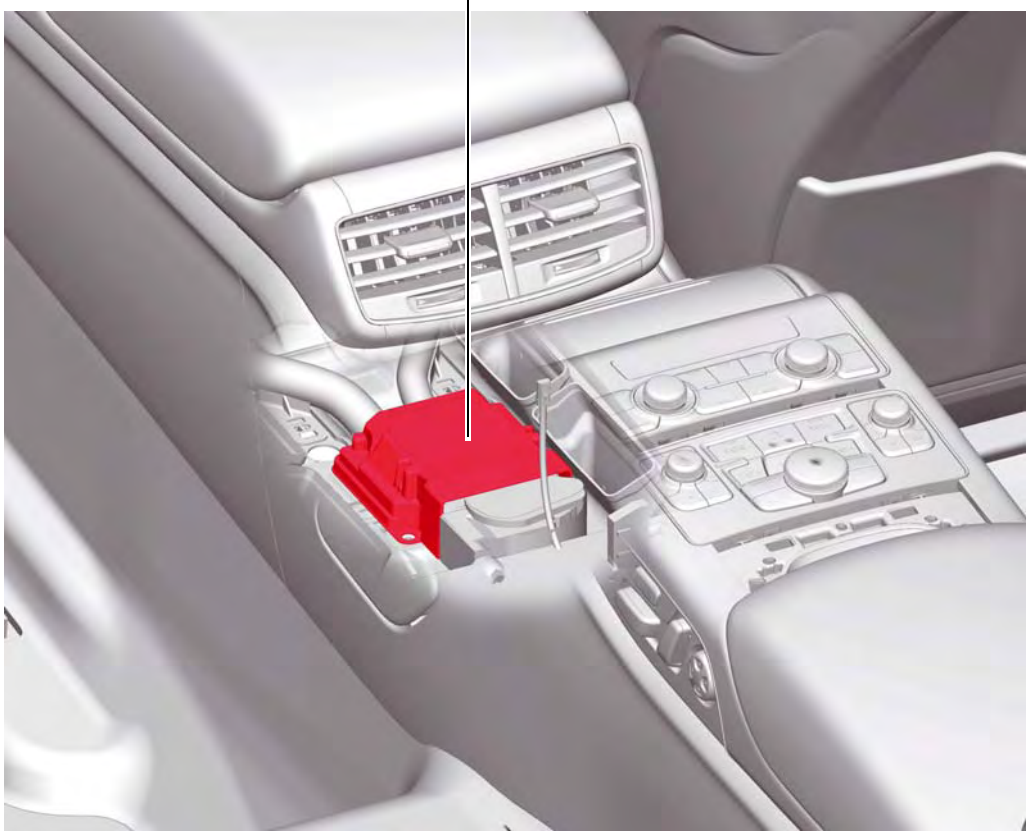
Airbag control unit J234

The task of the electronics integrated into the airbag control unit is to measure and evaluate the vehicle's acceleration or deceleration in such a way that a vehicle impact is detected. To measure the acceleration or deceleration of the vehicle during an impact, the external sensors are used in addition to the internal sensors in the control unit. The electronics in the airbag control unit can only detect an accident from the information provided by the sensors.

Only once all sensor information has been evaluated by the control unit electronics does the airbag control unit decide when and which safety components are to be activated. Depending on the nature and severity of the impact, the appropriate restraint systems (belt tensioner or belt tensioner and airbag) are activated. Other vehicle systems are also notified of the collision event. Thanks to the systematic further development of the hardware and software, the airbag control unit for the Audi A8 ’10 no longer needs the so-called "safety switch" (second crash sensor for head-on impact detection).

Basically, the main tasks of the airbag electronics are as follows:

- Collision detection (front, side, rear)
- Defined deployment of the belt tensioners, airbags and battery isolator
- Defined activation of front airbag adaptivity
- Defined activation of the adaptive belt force limiter
- Evaluation of all input information
- Continuous monitoring of the overall airbag system
- Independent power supply through a capacitor for a defined period of time (approx. 150 ms)
- Fault indication by airbag warning lamp
- Storage of fault and crash information
- Indication of a collision event to other system components via powertrain CAN
- Activation and deactivation of the seat belt reminder function



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Data exchange

The airbag control unit J234 is integrated into the powertrain CAN and continuously exchanges information with other vehicle systems via this data bus.

Among other things, the airbag control unit sends the following information:

- Airbag warning lamp K75 on/off
- Status of seatbelt buckles
- Diagnostic data
- Crash signal/crash severity
- Crash information for the actuator test
- Seat position
- Front passenger front airbag status

Among other things, the airbag control unit evaluates the following information:

- Dimming for the passenger OFF warning lamp
- Vehicle stationary or travelling
- Collision prediction[1)]
- Speed relative to objects[1)]

[1)] with adaptive cruise control/Audi side assist only

Airbag disabling key switch, front passenger side airbag

If the airbag disabling key switch, front passenger side E224 is in the "off" position, the passenger airbag is deactivated. The passenger airbag "off" warning lamp K145 comes on and the message "Passenger Airbag off" is displayed in the dash panel insert.
In addition to this, the reversible belt tensioning on the front passenger side is deactivated using the key switch.

Seat position sensing

To activate the adaptivity function of the belt force limiter and the front airbags at the right instant, the airbag control unit J234 needs to know whether the driver and front passenger seats are at the front or back of their adjustment range. The airbag control unit collects this information from the seat position sensors G553 and G554.

Side airbags

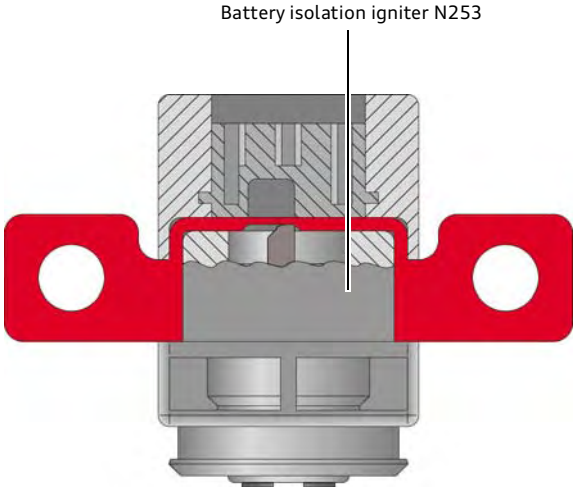
Side airbags, front and rear
The side airbags are identical to the modules installed in other Audi models. However, they have been adapted to meet the requirements of the Audi A8 '10.
The side airbag modules are fitted with solid fuel generators.

Head airbags

The head airbags cover almost the entire side window area. The length of the airbag varies according to body shape (long or short wheelbase).
The head airbags are inflated by hybrid gas generators integrated into the D post.

Battery isolation

Use is made of the well-known pyrotechnic battery isolating element, the battery isolation igniter N253.



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Pyrotechnic belt tensioners

Rack-type belt tensioners are used on the front seats as pyrotechnic belt tensioners. Band driven belt tensioners are used on the rear outer seats. The belt tensioners are integral to the inertia-reel seatbelts.
The pyrotechnic belt tensioners are activated by the airbag control unit J234.

Reference
For more information about the design and functioning of the pyrotechnic belt tensioners, refer to Self-Study Programme 410 "Audi occupant protection – passive systems".

Seatbelts

Among others, the following functions are integrated into the front inertia-reel seatbelts:

- Reversible belt tensioner with control unit
- Pyrotechnic belt tensioner
- Adaptive belt force limiter

Reversible belt tensioners:

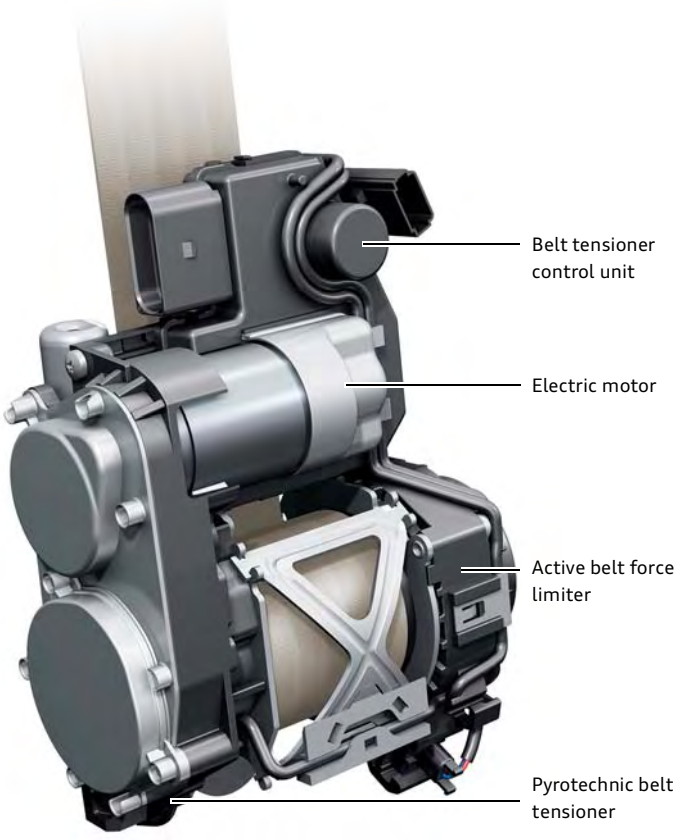
Front left belt tensioner control unit J854
Front right belt tensioner control unit J855

The front left and right belt tensioner control units J854 and J855 are integrated into the vehicle network via a CAN Extended bus and the data bus diagnostic interface J533. The belt tensioner control units activate the connected electric motors according to the information on the data bus.
Three different force levels are available:

1. Low force = belt slack reduction
2. Medium force = partial tensioning
3. High force = full tensioning

For a description of what force level is needed and when it is needed, refer to page 24 of the chapter on "Audi pre sense".

Also:
If the airbag control unit detects a minor head-on collision where the pyrotechnic seatbelt tensioners are not needed, it sends a corresponding data signal and the front belt tensioner control units initiate electrical full tensioning of the seat belts.



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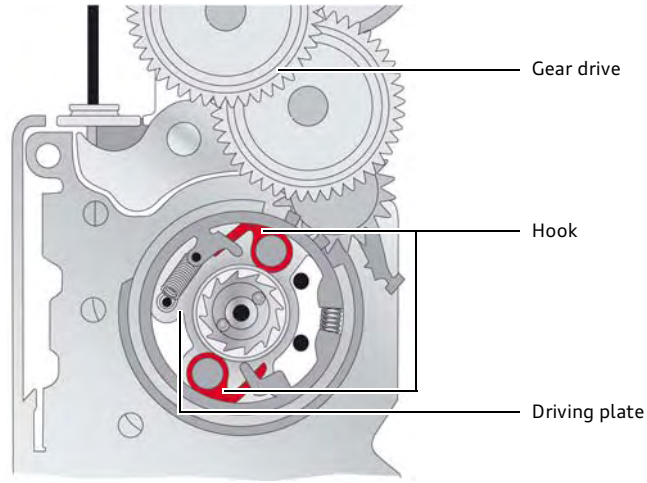
When the electric motor begins to work, a driving plate is driven by a toothed gearing. Two hooks deploy, connecting the driving plate to the seatbelt retractor shaft. The seatbelt is retracted.
When the electric motor stops or reverses slightly, the hooks retract again releasing the seatbelt retractor shaft.



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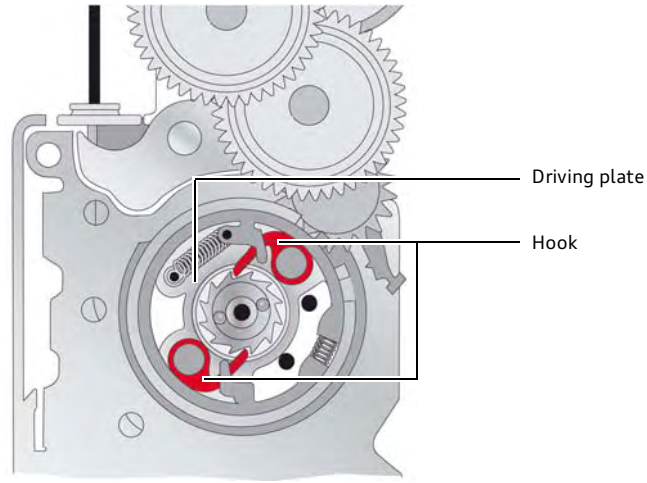

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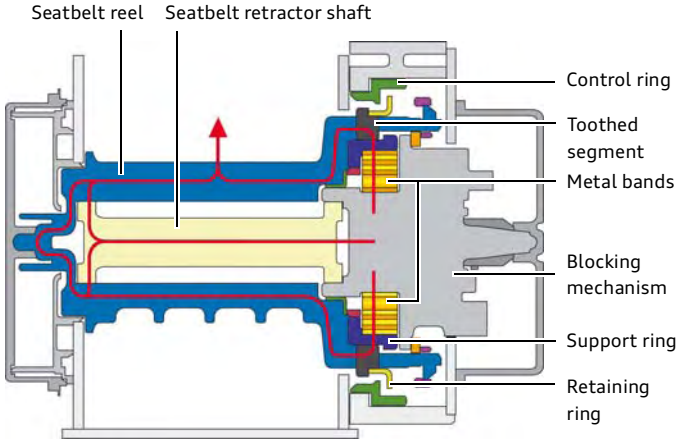
Adaptive belt force limiter

The front inertia-reel seat belts have dual-stage belt force limiters. In a head-on collision where the impact force exceeds the predetermined deployment threshold, the pyrotechnic seatbelt tensioners are ignited first. The inertia-reel seatbelt blocking mechanism then blocks the seatbelt retractor shaft and thus prevents the seatbelt from unwinding, as it would otherwise do due to the forward motion of the occupants.

To reduce the load exerted on the occupants by the seatbelt, the seatbelt retractor shaft and a belt winder allow the seatbelt to unwind in a controlled way.

The force counteracting the seatbelt is distributed as follows:

1. From the seatbelt reel to the blocking mechanism via the seatbelt retractor shaft. The seatbelt retractor shaft twists like a torsion bar.
2. From the seatbelt reel to the blocking mechanism via the toothed segments, the support ring and metal bands. The metal bands are connected to the support ring and to the blocking mechanism. The metal bands are retracted.



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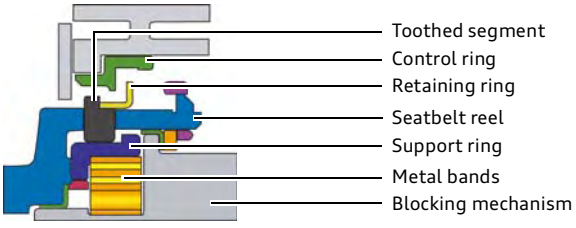
The airbag control unit activates the belt force limiter igniter according to the force of impact and the longitudinal position of the seat.
The resulting gas pressure displaces the piston and turns the control ring. This, in turn, displaces the retaining ring and the toothed segments detach from the support ring. The seatbelt winder is uncoupled. The torsion bar now begins to counteract the seat belt unwinding force.

The belt tensioning functions, the belt force limiter and the front airbags are co-ordinated with each other to ensure that the occupants are offered a good level of protection.

The belt force limiter igniters are not activated during a side or rear impact.



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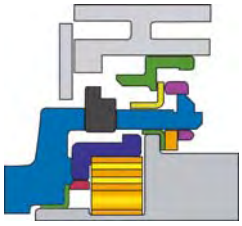

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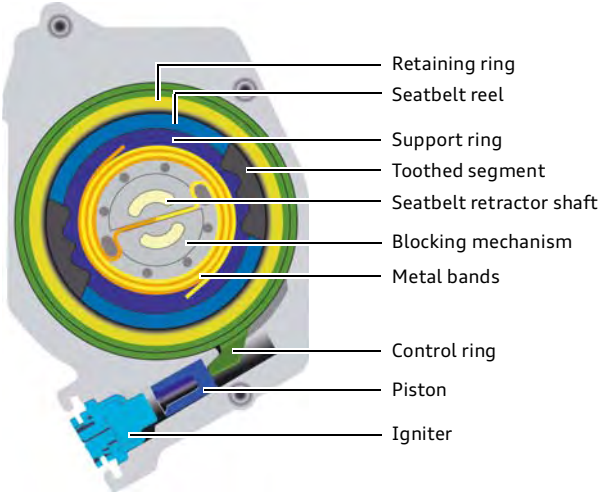

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Front airbags

The Audi A8 '10 is fitted as standard with adaptive driver and passenger airbags (this applies world-wide). However, different gas generators are used. An airbag module with a single-stage solid fuel generator is located on the driver's side.

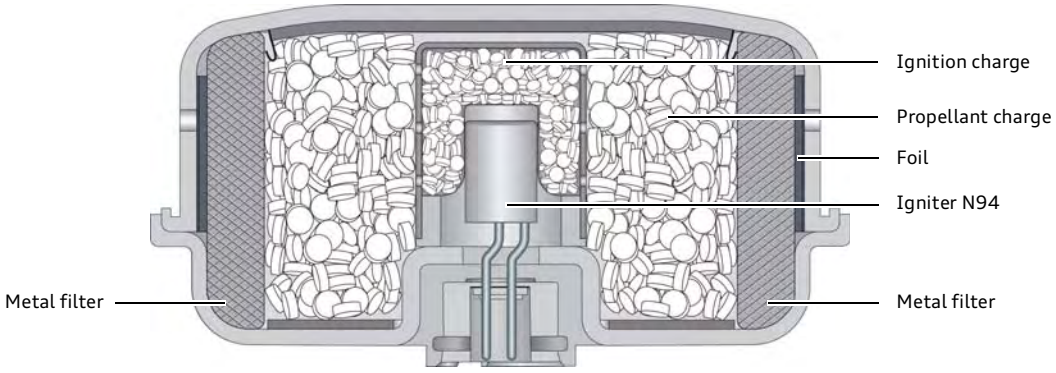
On the front passenger side, the airbag module is fitted out with a hybrid gas generator. The adaptivity function is similar in both airbag modules. The adaptivity function of the driver airbag is described below.

Driver airbag

The airbag control unit J234 activates the driver side airbag igniter N95, igniting the ignition charge. The ignition charge then ignites the actual propellant charge. If the gas pressure produced by combustion of the propellant charge exceeds a predetermined level, a foil opens the discharge ports. This allows the gas to flow through the metal filter and into the airbag. The airbag unfolds and is inflated.
To provide adaptivity, there is an additional igniter - the driver airbag discharge valve igniter N490 - on the back of the gas generator and an additional trunk-like discharge port in the airbag.

This discharge port is kept closed in the airbag by a band. Depending on the force of impact and the driver's seating position, the airbag control unit J234 activates the driver airbag discharge valve igniter, cutting the band and opening the additional discharge port. In this way, the airbag is "adapted" to the situation for the occupants.

The gas generators of the driver airbag module are oscillatingly mounted in a rubber ring. This allows steering wheel vibrations to be minimised.



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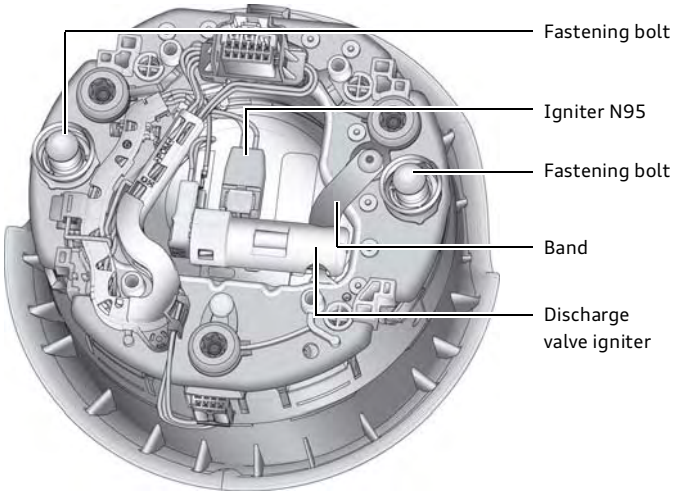

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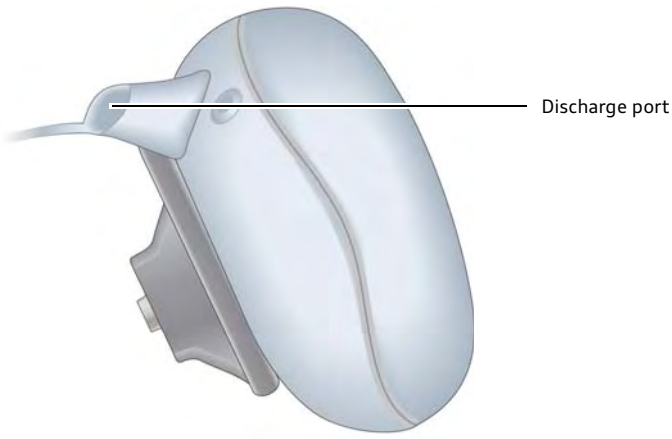

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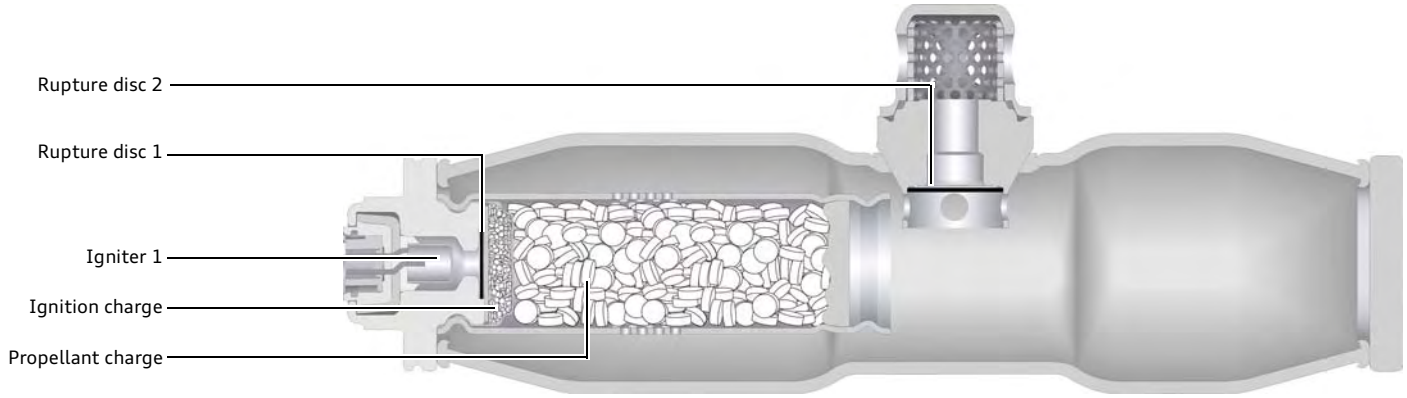
Note
The driver airbag module has a new attachment on the steering wheel. Refer to ELSA for information on removing and installing the driver airbag module.

Passenger airbag

The front passenger airbag is fitted out with a single-stage hybrid gas generator. Front passenger side airbag igniter 1 N131 is activated by the airbag control unit J234. The flame of the igniter 1 breaks through rupture disc 1 and ignites the ignition charge. The ignition charge, in turn, ignites the actual propellant charge.

The combustion of the propellant charge causes the pressure inside the compressed gas cylinder to increase to the point where rupture disc 2 bursts. The gas mixture unfolds and inflates the airbag. Passenger airbag adaptivity function works in much the same way as for the driver airbag, and is described on page 18.



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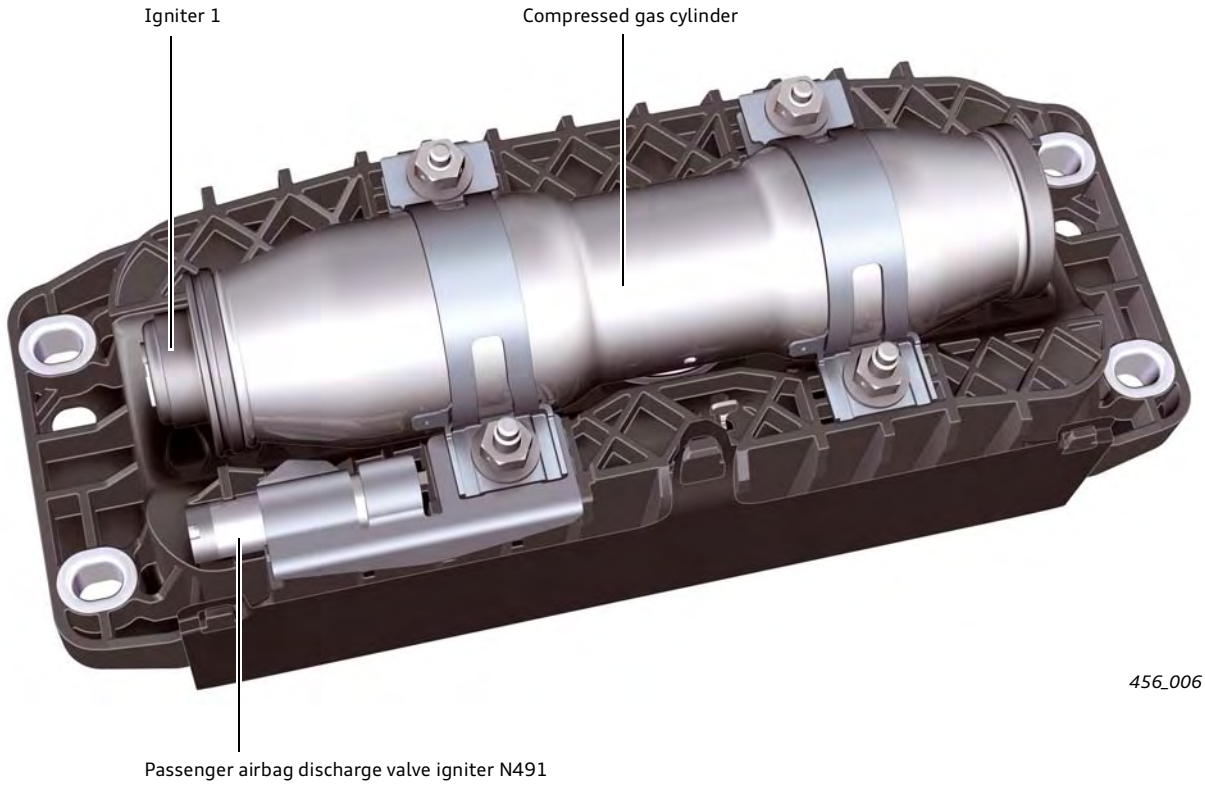

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Additional notes on passive safety for specific markets

To meet the statutory and specific requirements of some countries, the Audi A8 '10 can be fitted out with auxiliary systems.

Available auxiliary systems include:

- Seat occupied sensor
- Knee airbags
- Active head restraints
- Seatbelts with "child seat restraint" function (passenger and rear seats)
- Rollover protection system
- Pedestrian protection system

Passenger seat occupied sensor

The passenger seat occupied sensor is identical to the system used in other Audi models such as the Q7.
However, the components have been adapted to suit the requirements of the Audi A8 '10.

- Seat cushion
- Sensor mat for seat occupied sensor
- Pressure sensor for seat occupied recognition G452
- Seat occupied sensor control unit J706

They form a unit and must not be separated from one another.

- Seatbelt switch, front passenger side E25
- Belt force sensor for seat occupied recognition G453
- Passenger airbag OFF warning lamp K145
- Airbag control unit J234

Reference
For more information about passenger seat occupied recognition systems, refer to Self-Study Programme 410 "Audi occupant protection – passive systems".

Rollover protection system

Two additional sensors for rollover recognition have been integrated in the airbag control unit J234. For higher rollover recognition sensitivity, information is also collected from the ABS control unit J104, the active steering control unit J792 and from the steering angle sender G85.

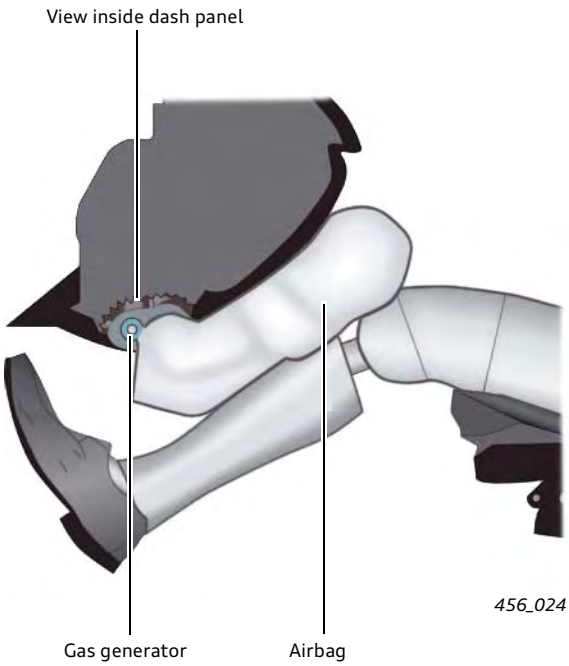
The airbag control unit does not necessarily require this information. It is capable of independently identifying a rollover situation. When a rollover is detected, the belt tensioners and the head airbags are activated.

Note
When carrying out work on the airbag system, it is very important to pay strict attention to the safety instructions given in the valid Workshop Manual.

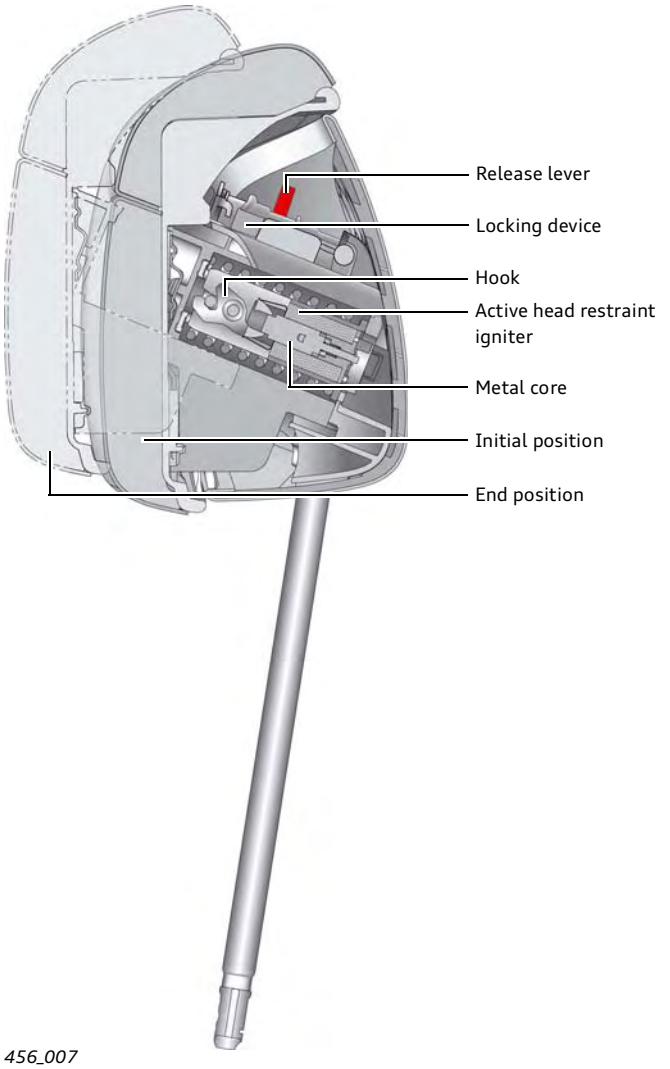
Knee airbags

Knee airbag igniter, driver side N295
Knee airbag igniter, front passenger side N296

The ignited knee airbags allow the occupants to be involved earlier in the process of vehicle deceleration. On the driver side, the knee airbag is integrated in the footwell trim below the dash panel. On the front passenger side the knee airbag is located behind the glove box lid. The knee airbags are activated in combination with the front airbags. Hybrid gas generators are used.



456_024



456_007

Active head restraints

Active head restraint igniter, driver side N419
Active head restraint igniter, front passenger side N420

If the airbag control unit J234 detects a rear impact where the force exceeds a predetermined deployment threshold, the active head restraints on the front seats are activated in addition to the belt tensioners. When the airbag control unit activates the active head restraint igniters N419 and N420, the metal core is drawn into the magnetic coil. The hook no longer rests on the metal core and releases the front part of the head restraint.

The head restraint moves approx. 50 mm forwards and approx. 20 mm upwards. A locking device prevents the front part of the head restraint from returning to its original position.

The active head restraints are reversible. The lock can be released using the release lever, allowing the extended part of the head restraint to be pushed back again. Note the information given in ELSA.

Pedestrian protection

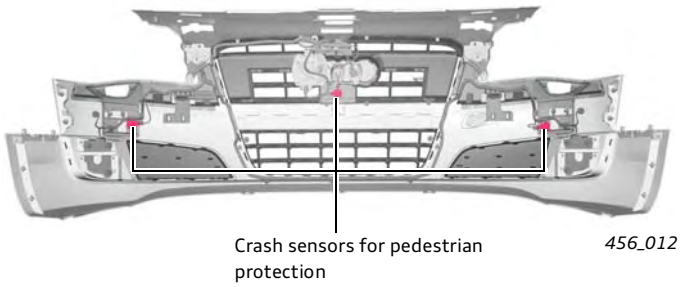
The Audi A8 '10 has three additional acceleration sensors for detecting a collision with a pedestrian:

- Driver side crash sensor for pedestrian protection G570
- Passenger side crash sensor for pedestrian protection G571
- Centre crash sensor for pedestrian protection G693

These sensors are mounted on the back of the bumper cover. If contact with a pedestrian is detected at a speed of between approx. 25 and 55 kph, the airbag control unit J234 activates both pedestrian safety devices G598 and G599.

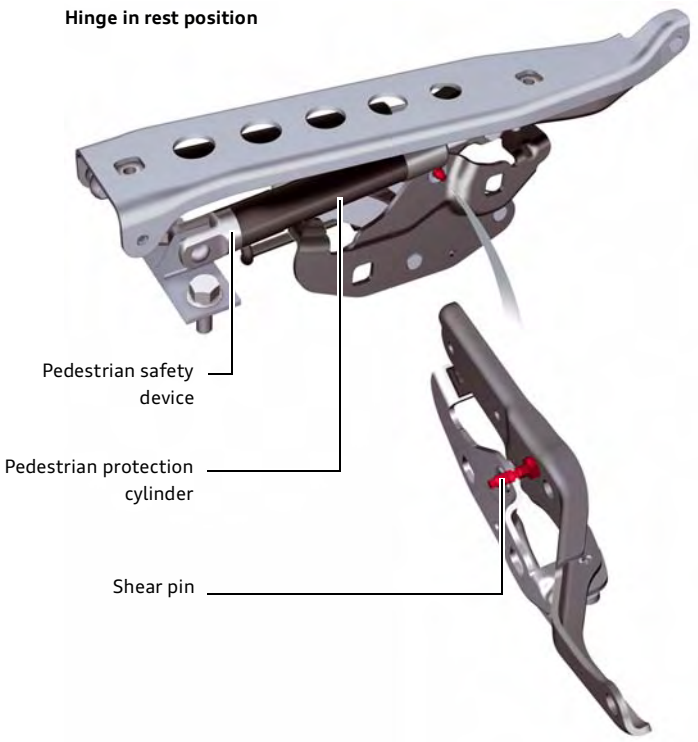
The pedestrian safety devices are small pyrotechnic propellant charges.
When the propellant charges are ignited, the resulting gas pressure pushes the pistons into the pedestrian protection cylinders.

The shear pins are sheared off and the engine hood is raised approx. 40 mm at the back by the kinematics of the hood hinges. At the same time, the engine hood moves back approx. 33 mm because of the channel-guided latch mechanism.



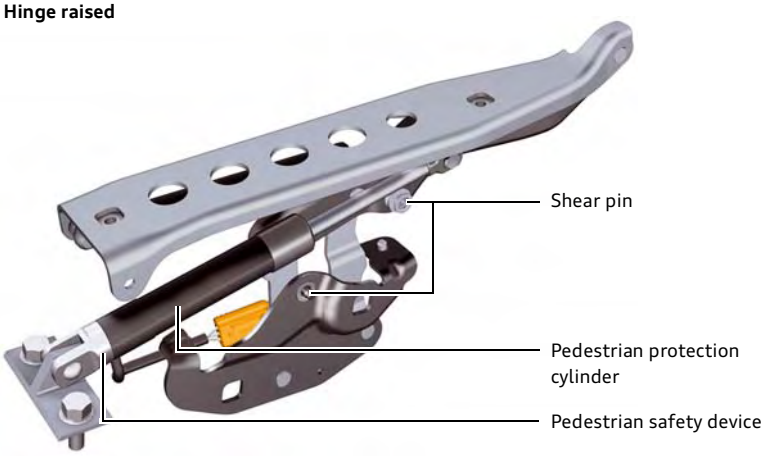
456_012

Hinge in rest position



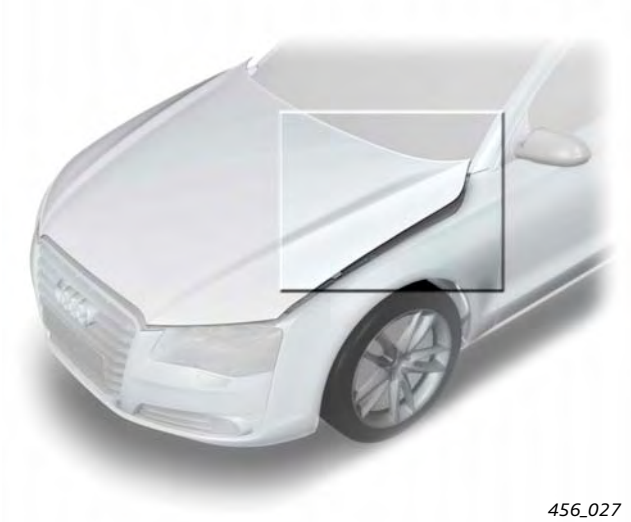
456_028

Hinge raised



456_015

To reopen the engine hood after the pedestrian protection function has tripped, first of all the engine hood has to be returned to its original position.
This is done by pushing the engine hood down at the back and simultaneously in the direction of travel as far as a stop.



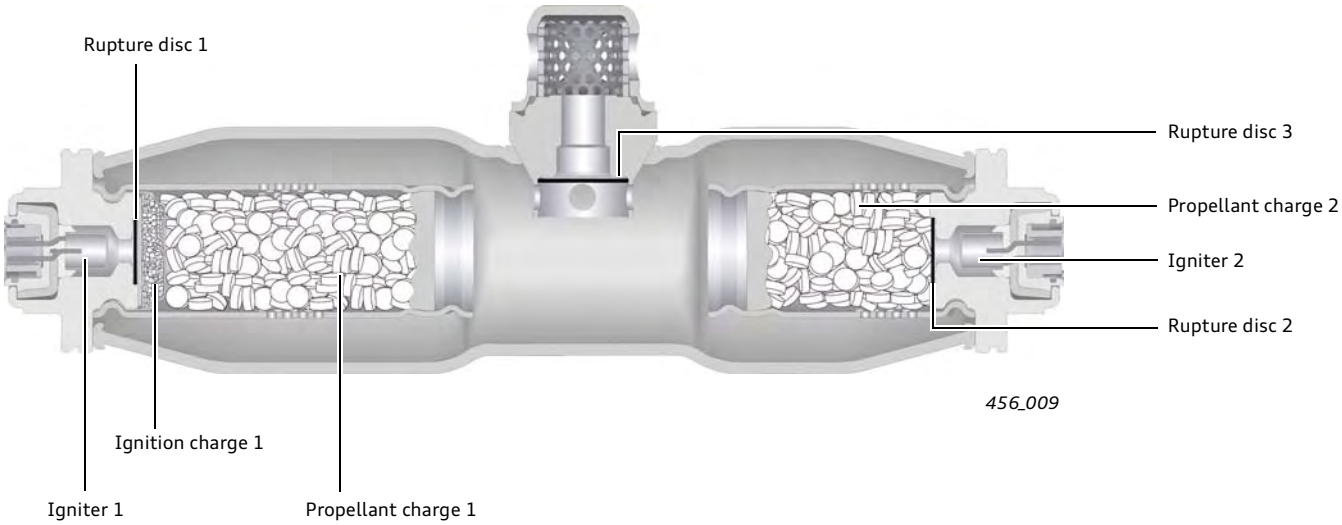
456_027

Passenger airbag

The Audi A8 ’10 may be fitted out with a two-stage adaptive passenger front airbag. The gas generator is a two-stage hybrid gas generator.

Based on the accident situation, the airbag control unit J234 sets the time interval at which the front passenger side airbag igniter 2 N132 is to be ignited after front passenger side airbag igniter 1 N131.
The adaptivity function of the passenger airbag works in much the same way as for the driver airbag and is described on page 18.

Passenger-side gas generator, single-stage and two-stage



Note
When carrying out work on the airbag system, it is very important to pay strict attention to the safety instructions given in the applicable Workshop Manual.

Active safety

Audi pre sense

Active, passive and integral safety; driver assistance systems and preventive occupant protection are but a few of the many terms used to describe the ever-improving systems which assist the driver. The key to good occupant protection is early detection of hazards and deployment of technical safety devices in a manner appropriate to the situation. This is the principle on which Audi pre sense is based. Audi pre sense basic is standard equipment in the Audi A8 ’10. The customer can also order Audi pre sense front and/or Audi pre sense rear (optional).

Audi pre sense is unable to prevent accidents. It alerts the driver to hazardous situations and assists where technically feasible.

The Audi pre sense system has been made possible by networking of various in-car systems. The individual control units supply the vehicle with a continuous flow of information via the data bus systems. The associated control units can evaluate the information and take action, if necessary.

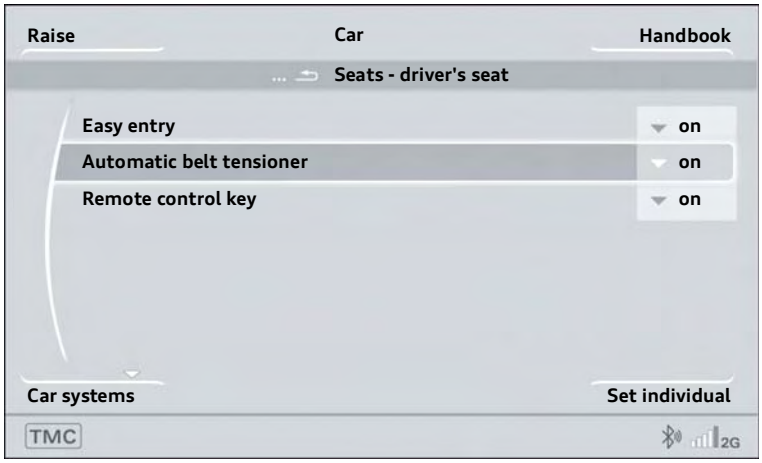
Audi pre sense basic

Function of automatic belt tensioner

If the front occupants in the Audi A8 ’10 are wearing their seat belts and a speed signal of approx. 15 kph (forward travel) is detected, then the front left and right belt tensioner control units J854 and J855 reduce the belt slack. The seatbelts gently retracted by briefly energising the electric motors in the inertia-reel seatbelts.

The seatbelts are then released again. If the front seat belts are being worn and the vehicle is travelling forwards at a speed of < 15 kph, belt slack is reduced after approx. 10 seconds. If the seatbelts are not being worn, the electric motors in the inertia-reel seatbelts are not activated.

The occupants can switch the automatic belt tensioner (belt slack reduction) off and on again via the MMI.



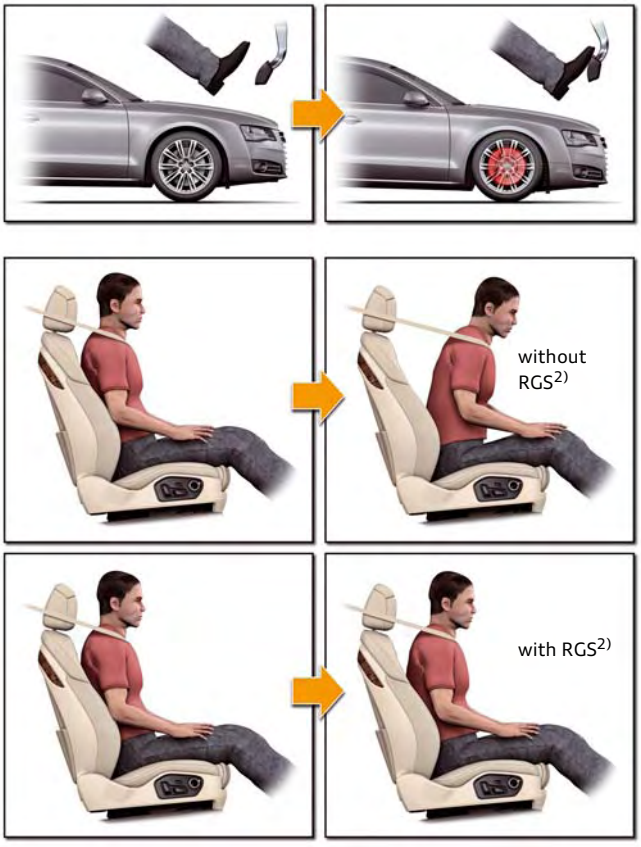
456_078

Longitudinal dynamics function

If the vehicle is moving in the direction of travel and the driver applies heavy braking, the belt tensioner control units (J854 and J855) initiate partial tensioning of the seat belts when a predetermined braking pressure is exceeded.

If the driver performs a dangerous braking manoeuvre (emergency braking), a sudden increase in brake pressure occurs in the brake system due to the pressure on the brake pedal. If the brake pressure reaches a certain level within a defined period of time, the seatbelts are fully tensioned by control units J854 and J855.

The ABS control unit J104 also turns on the hazard warning light system. Electrical tensioning of the seatbelts reduces the forward motion of the occupants by up to approx. 10 cm, depending on the situation.



456_073

Transverse dynamics function

If the vehicle begins to understeer or oversteer, the Electronic Stability Programme (ESP) is activated.
The seatbelts are partially tensioned. If the physical limits are exceeded and the vehicle can no longer be stabilised, the seat belts are fully tensioned. Closing of the side windows and the tilt/slide sunroof[1)] is initiated.

If an accident does not occur in the driving situations described here, then the seatbelts are again released and the hazard warning lights (if "on") are turned off.

Depending on how Audi drive select is configured and whether TCS is on or off, the seat belts are electrically tensioned according to the driving situation.

Audi drive select		Auto	Comfort	Dynamic
TCS	on	Partial and full	Partial and full	Full
	off	Partial and full under braking	Partial and full under braking	Full under braking

Due to the short amount of time available, the side windows and the slide/tilt sunroof[1)] may not always close fully.

Closing of the side windows and the slide/tilt sunroof can reduce the probability of miscellaneous objects penetrating the occupant cell.

[1)] Optional equipment
[2)] Reversible belt tensioner

Audi pre sense front

Both Audi pre sense basic and Audi pre sense front are available in combination with the optional adaptive cruise control (ACC) system.
In addition, Audi braking guard can be ordered in combination with adaptive cruise control. The radar sensors of the ACC monitor the traffic ahead and send information to the ACC control unit J428. The ACC control unit evaluates this data and transfers the information to the data bus.

Other control units can receive and evaluate these messages and take appropriate action. Even if the adaptive cruise control is not activated, the radar sensors monitor the traffic ahead and send information.

To implement the Audi pre sense plus system, Audi side assist is required in addition to adaptive cruise control.
Audi side assist also monitors traffic behind the vehicle.

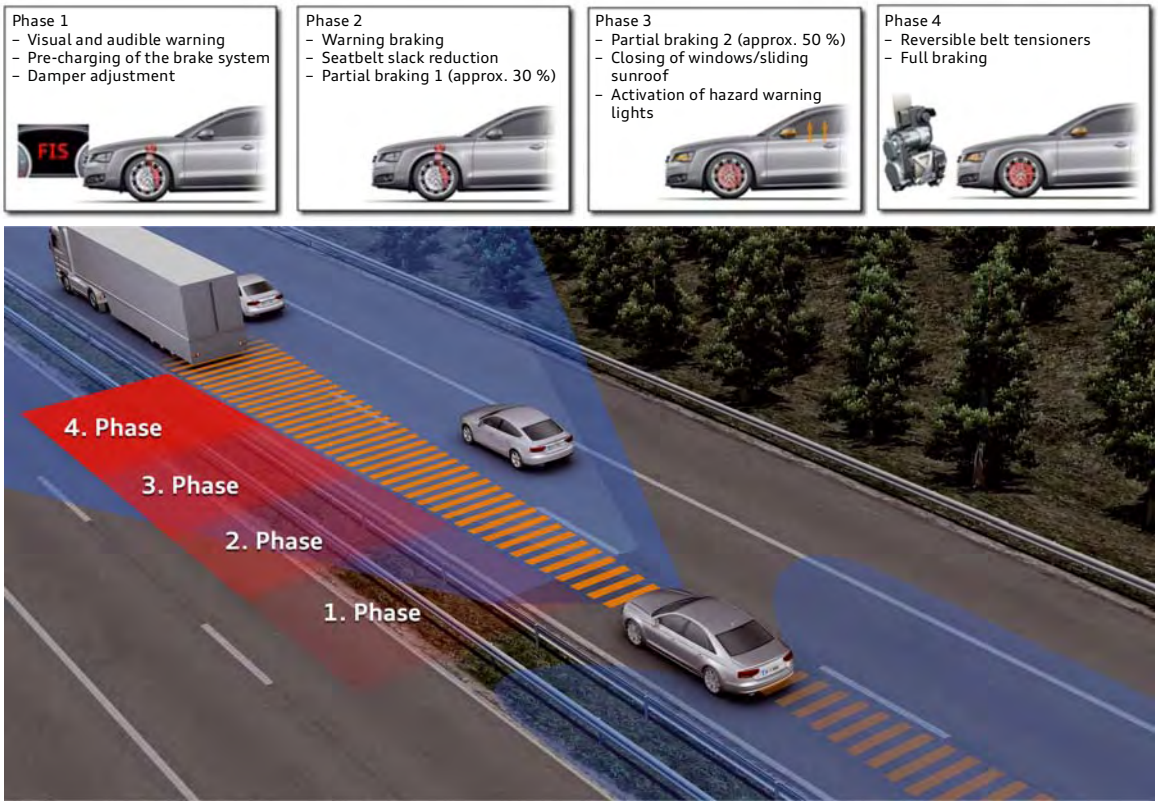
Example of a situation:

Phase 1:
If the vehicle is approaching a hazardous situation, the driver is alerted visually and audibly by the control unit with display in dash panel insert J285. At the same time, the ABS control unit J104 pre-charges the brake system and the adaptive suspension control unit J197 sets the damping to "firm".

Phase 2:
If the driver does not react to the warnings from the dash panel insert or only takes his foot off the accelerator, the ABS control unit carries out a warning braking.
The vehicle is then braked again by partial braking I (approx. 30 % brake pressure). Seatbelt slack is reduced during the warning braking by the front left and right belt tensioner control units J854 and J855.

Phase 3: (Audi pre sense plus only)
If the driver still does not apply the brakes, then partial braking 2 (approx. 50 % brake pressure) is initiated by the ABS control unit. In addition, the hazard warning lights are activated by the ACC control unit J428 and closing of the side windows and the slide/tilt sunroof[1)] is initiated by the driver side belt tensioner control unit.

Phase 4: (Audi pre sense plus only)
A full braking (approx. 100 % brake pressure) is initiated. This reduces the severity of the collision. In addition, the front seatbelts are fully tensioned.



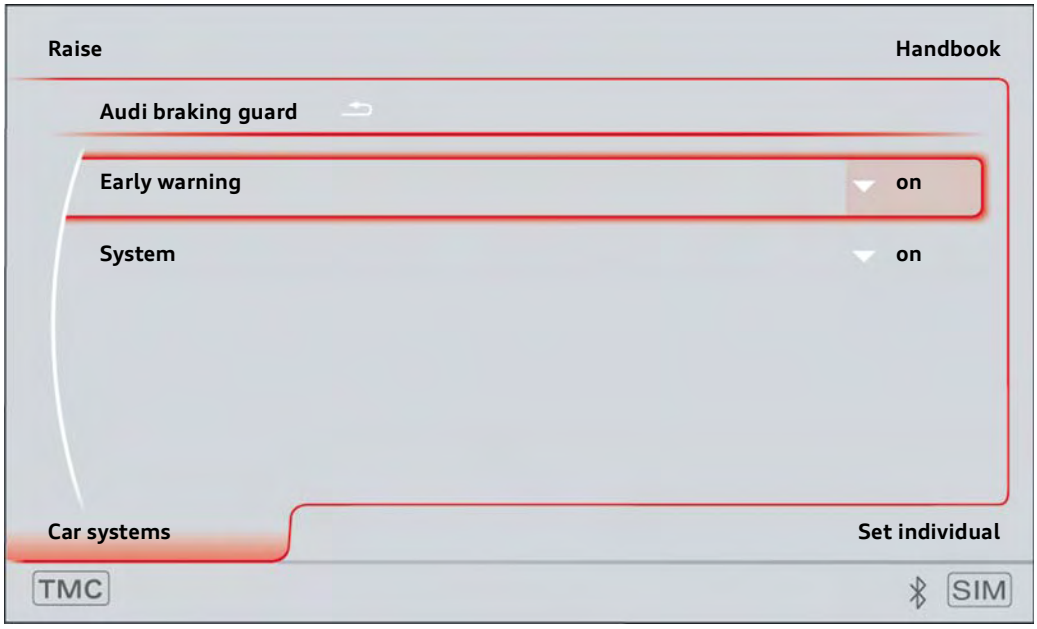
456_074

[1)] Optional equipment

If the driver accelerates sharply during phases 2 and 3 despite all of these warnings, then the partial braking operation is aborted after the warning braking and the ACC control unit does not apply any more braking. If the driver brakes during phase 1, the Audi braking guard recognises that the driver has been alerted and takes no further action.

If the driver enters a hazardous situation during normal vehicle operation and underestimates the risks involved, he will be assisted by Audi pre sense front. If the driver does not apply sufficient brake pressure, the Audi braking guard helps by boosting the brake pressure.

If the driver decides he does not want the braking guard function, it can be deactivated at the MMI control unit. It is possible to deactivate the visual and audible warnings only or to deactivate the complete Audi braking guard system and the following functions: warning braking, partial braking, full braking and activation of hazard warning lights.



456_096

Audi pre set

The airbag control unit J234 is also able to react based on the information transferred to the data bus by the ACC control unit J428. The "time to collision" and "speed relative to objects ahead" are important information for the airbag control unit. As of a predetermined value, the control unit J234 knows that a collision is imminent. The electronics in the airbag control unit are alerted and stand by for information from the crash sensors.

Reference
For more information about the adaptive cruise control and the Audi braking guard, refer to Self-Study Programme 458 "Audi A8 '10 Suspension system".

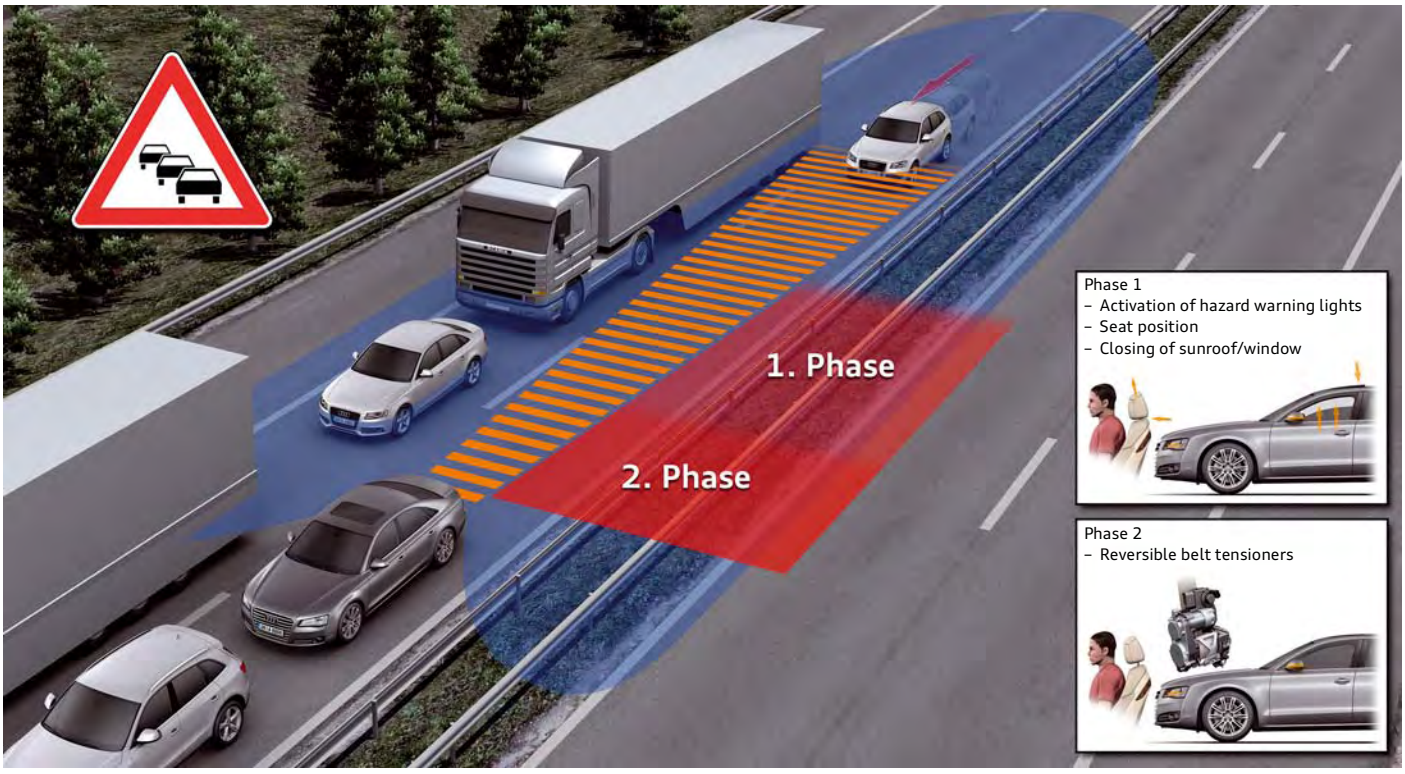
Audi pre sense rear

Audi pre sense rear is available with Audi side assist. It also allows following traffic to be analysed.
The radar sensors of the Audi side assist provide a continuous flow of information to the Audi side assist control unit J769.

The Audi side assist control unit evaluates this information and transfers the data to the data bus. Even if Audi side assist has been turned off by the driver, the control unit J769 nevertheless sends data.

Phase 1:
If a vehicle is approaching from behind and an accident is anticipated, the driver side front belt tensioner control unit sends information via data bus. The side windows and the slide/tilt sunroof[1)] are closed and the hazard warning lights are turned on. If the vehicle has memory seats at the front, the head restraints move into their upper position. If the vehicle has comfort seats in the front and memory seats in the rear, the head restraints on all seats are moved into their upper position and the upper backrests are electrically inclined forwards.

Phase 2:
If the vehicle continues to approach and an accident is probably unavoidable, the front seatbelts are electrically tensioned.



456_075

In vehicles fitted with a tow bar, Audi pre sense rear is not active unless a trailer is detected.

1) Optional equipment

The overview shows, by way of example, the information which is exchanged via CAN data bus.
> = sending data < = receiving data without > / < = initiated actions

456_076

Engine

Short technical description of the 4.2l V8 FSI engine in the Audi A8 ’10

Technical features

- Trioval sprockets on the camshafts
- Friction between piston rings and cylinder liners due to change in honing parameters in combination with improved piston rings
- Supply-on-demand two-stage oil pump
- Dual-flow intake manifold
- Unrestricted fill monitoring system in place of air mass meter
- Innovative Thermal Management (ITM)
- Multi-port high-pressure injector in place of tumble valves
- Recuperation

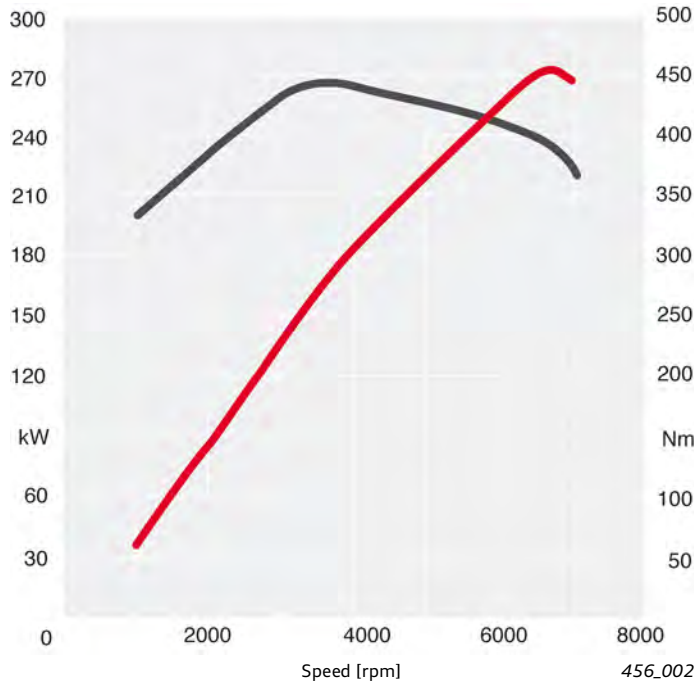
456_001

4.2l V8 FSI engine with engine code CDRA

Torque/power curve

Max. torque in Nm

Max. power output in kW



Specifications

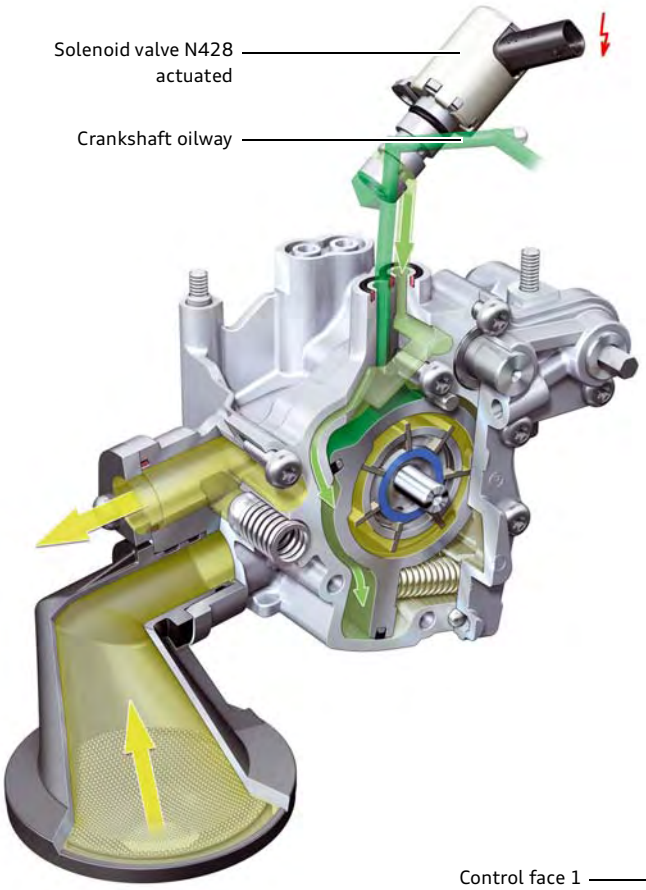
Engine code	**CDRA**
Engine type	V8 engine
Displacement in cm^3	4163
Max. power in kW (bhp)	273 (372) at 6800 rpm
Max. torque in Nm	445 at 3500 rpm
Valves per cylinder	4
Bore in mm	84.5
Stroke in mm	92.8
Compression ratio	12.5:1
Firing order	1–5–4–8–6–3–7–2
Engine management	Bosch MED 17
Fuel grade	98/95 RON
Exhaust emission standard	EU V / ULEV2

Volume-flow controlled oil pump of the 4.2l V8 FSI engine and 4.2l V8 TDI engine

A volume-flow control system is used to reduce the power required to drive the oil pump.
In accordance with the AUDI V engine family strategy, the oil pump in the 4.2l V8 FSI engine is also fitted in the 4.2l V8 TDI engine as a common part.

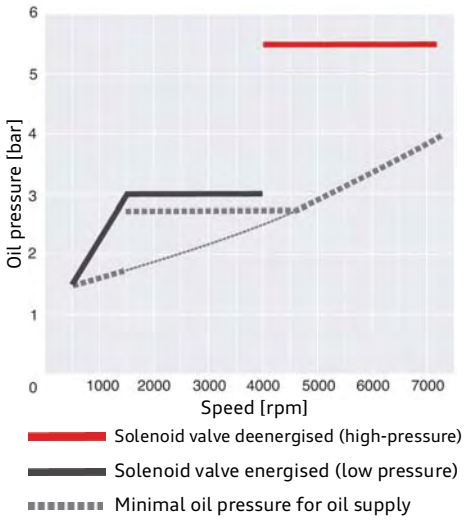
A rotary vane pump with a delivery characteristic variable by means of an excentrically mounted adjusting ring is used on the new 4.2l V8 FSI/TDI engine.
This adjusting ring can be pressurised with hydraulic fluid across control faces 1 + 2 and swivelled against the pressure of the control spring.
At low engine speeds, the ECU applies ground potential to the energised solenoid valve N428 (terminal 15), which then opens the oilway to the second control face of the adjusting ring.

Both oil flows now act upon both control faces, applying equal pressure to each.
The resultant forces are greater than those exerted by the control springs and swivel the adjusting ring in an anticlockwise direction.
The adjusting ring swivels towards the centre of the rotary vane pump and reduces the flow space between the vanes.
The lower pressure level is activated according to engine load, engine speed, oil temperature and other operating parameters, thus reducing the power required to drive the oil pump.
Design criteria here are the oil supply to the big-end bearings and ensuring that the pistons are adequately cooled under high load.



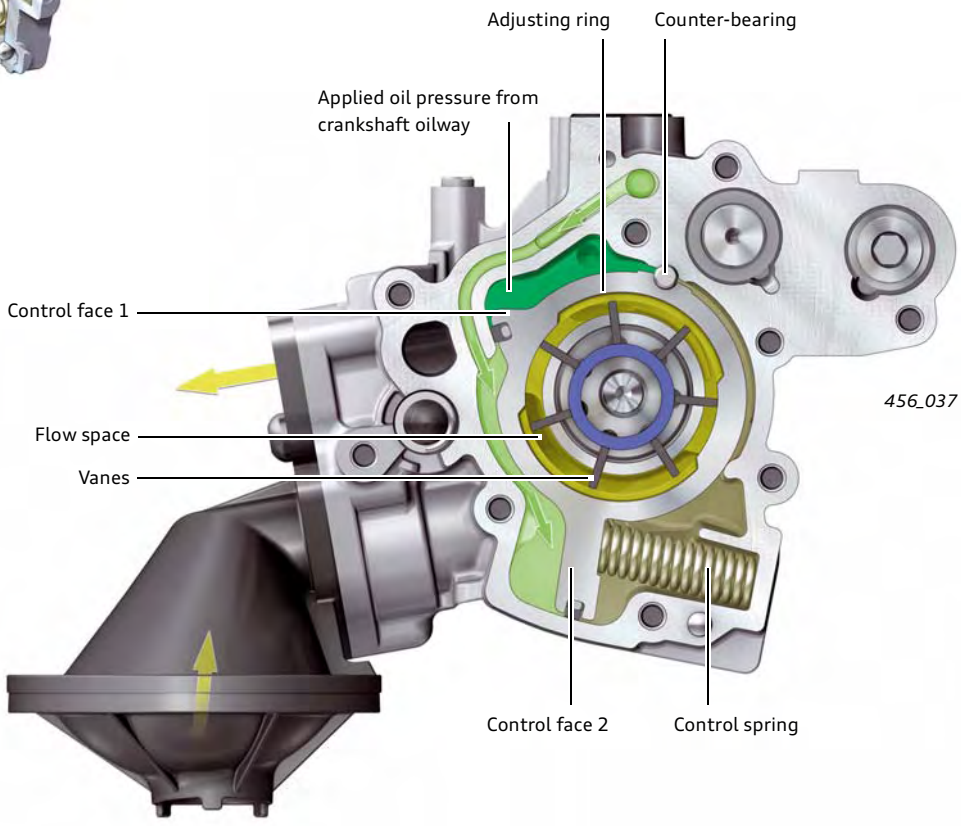
456_018

Oil pressure characteristic at 120 °C oil temperature (FSI engine)



456_063

Low delivery rate



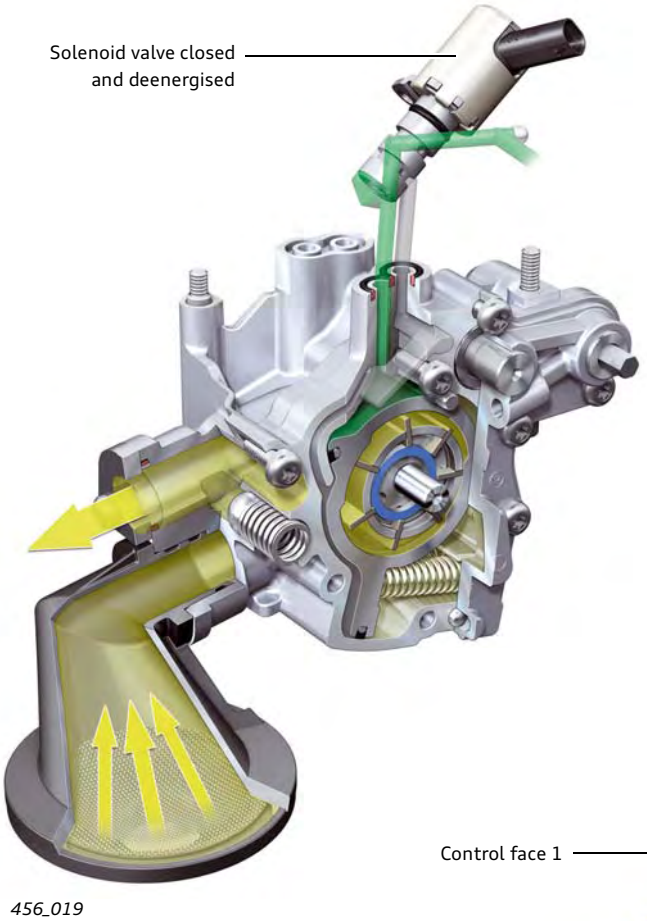
456_037

High delivery rate

At speeds of higher than 4000 rpm in the FSI engine and 2500 rpm in the TDI engine or at high torque (full throttle acceleration), the solenoid valve N428 is isolated from ground by the engine control unit J623. This closes off the channel from the oilway to control face 2.
The oil pressure now acts on control face 1 only and counters the force of the control spring with a lesser force.

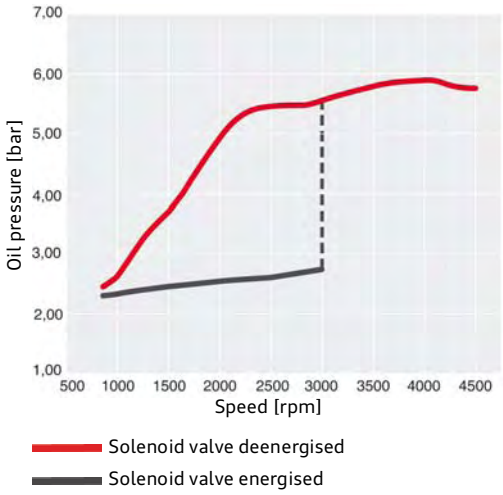
The control spring swivels the adjusting ring about the counter-bearing in a clockwise direction. The adjusting ring now swivels away from the centre position, thus enlarging the flow space between the individual vanes.

The enlarged spaces between the vanes allow more oil to be conveyed. The higher rate of oil flow through the oil orifices and the crankshaft bearing backlash are counteracted by a resistance, causing the oil pressure to increase.
The result is a volume-flow controlled oil pump with dual pressure stages.



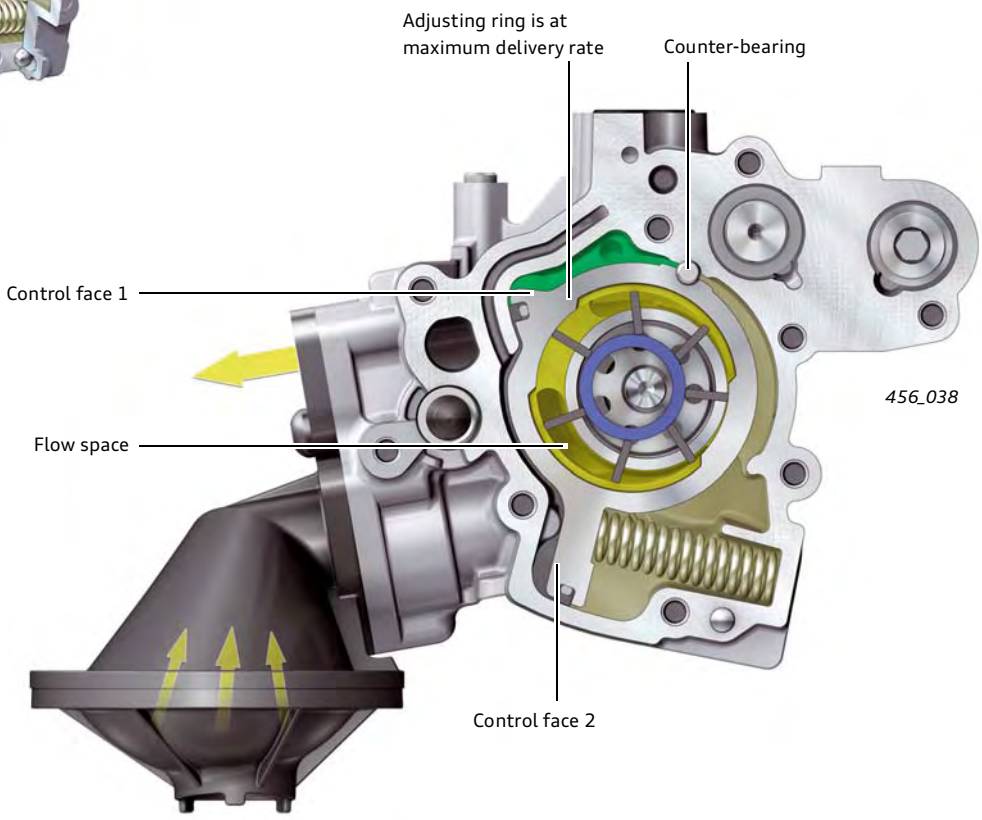
456_019

Oil pressure characteristic at 100 °C oil temperature (TDI engine)



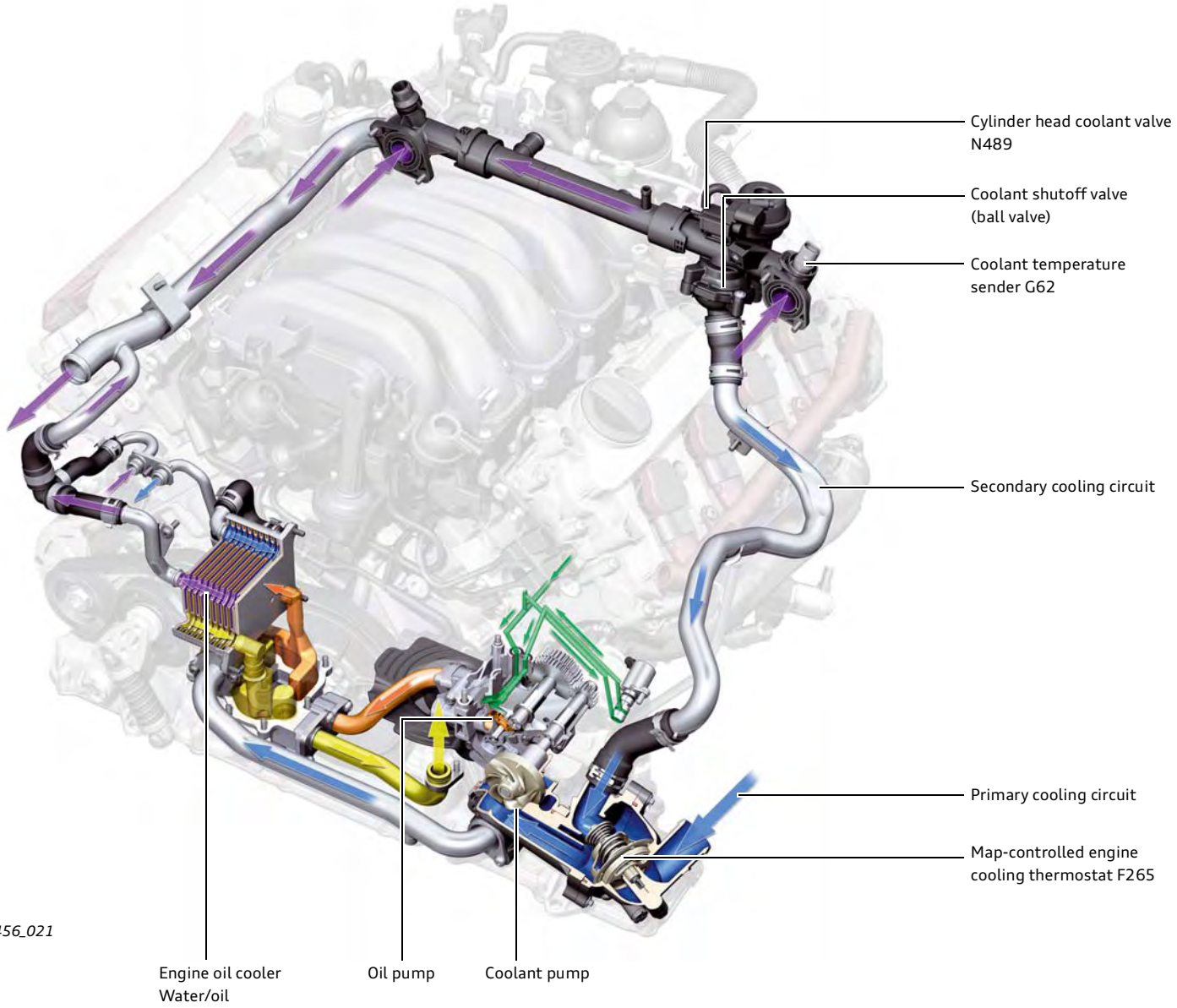
456_064

High delivery rate



456_038

Innovative Thermal Management (ITM) in the 4.2l V8 FSI engine



An Innovative Thermal Management system is used in an Audi A8 '10 for the first time.
Innovative Thermal Management is an electronically controlled system designed to optimally distribute the heat flow provided by the engine. The system is controlled by the Heat Manager, a recently developed software module fully integrated into the engine control unit.

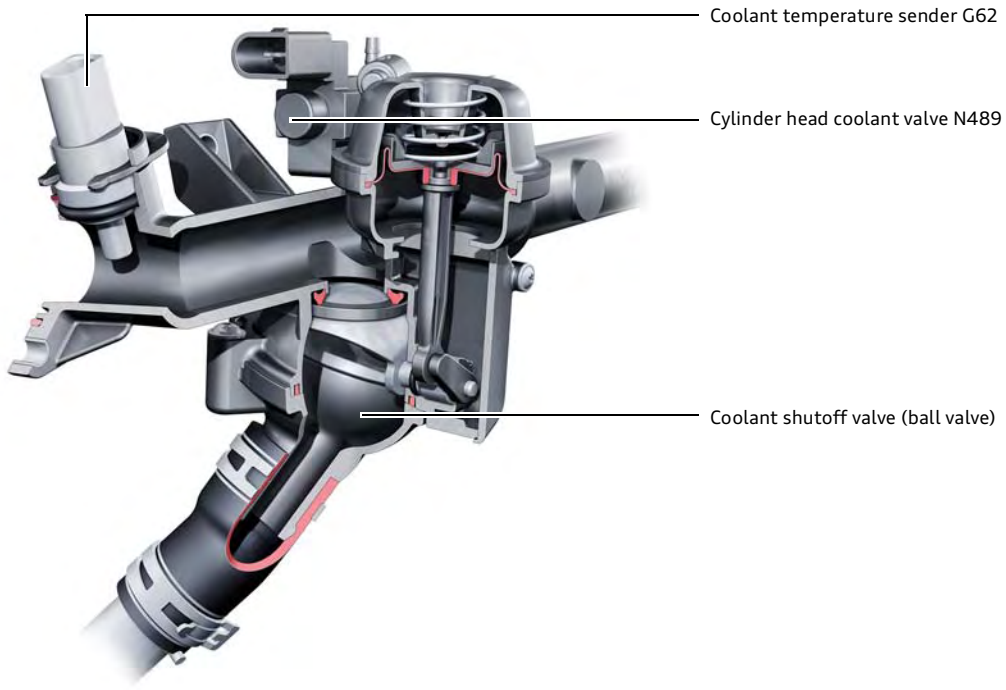
For this purpose, the coolant is distributed on demand between the engine, gearbox and occupant cell by a system of valves.
To ensure maximum comfort, the demands of the heating and climate control systems are factored in at all times.
The air conditioning and gearbox control units indicate their heating requirements to the engine control unit via CAN bus. These heating requirements, together with the engine heating request from the engine control unit, are then weighted and prioritised.
The Innovative Thermal Management components are activated accordingly.

The map-controlled engine cooling thermostat F265 opens at a coolant temperature of approx. 95 °C and opens the inflow from the radiator. At full throttle, the thermostat is energised and again closes slightly, allowing the coolant temperature to increase to approx. 99 °C. The warmer oil is conducive to smooth running of the engine.

Stationary coolant

When the engine is cold, the coolant shutoff valve (ball valve) is closed by the solenoid valve N489 of engine control unit J623, and the inflow from the secondary cooling circuit to the water pump is shut off.

Coolant shutoff valve (ball valve) closed

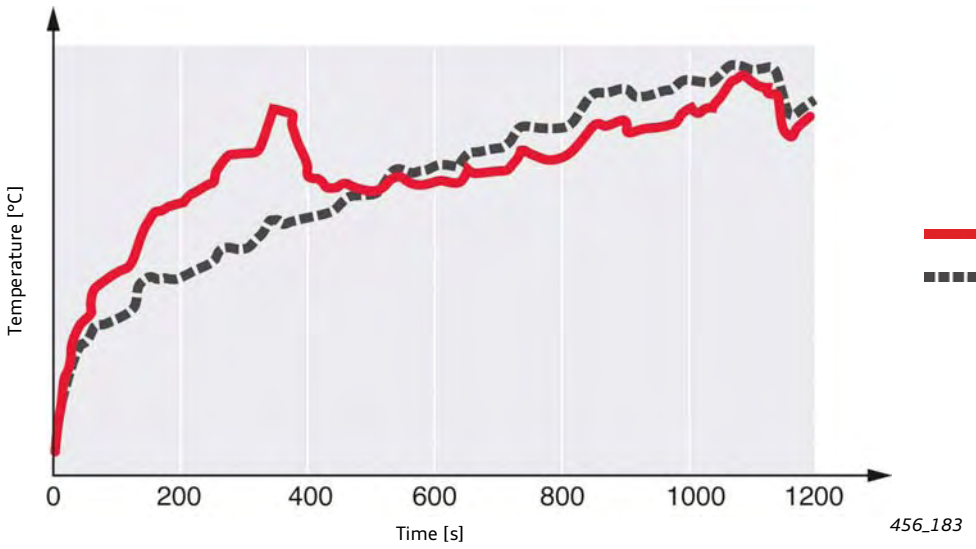


456_023

Depending on the boundary conditions (ambient temperature, air conditioner setting, engine and gearbox temperatures), stationary coolant is produced by closing all the valves in the cooling circuit. This allows the engine to reaching operating temperature more quickly than in conventional systems. The stationary coolant phase normally takes approx. 120 seconds.

However, there are also exceptional circumstances where stationary coolant is unwanted, e.g. when the Defrost button is pressed. Warm coolant flows immediately to the heater in order to prevent the windscreen from fogging up.

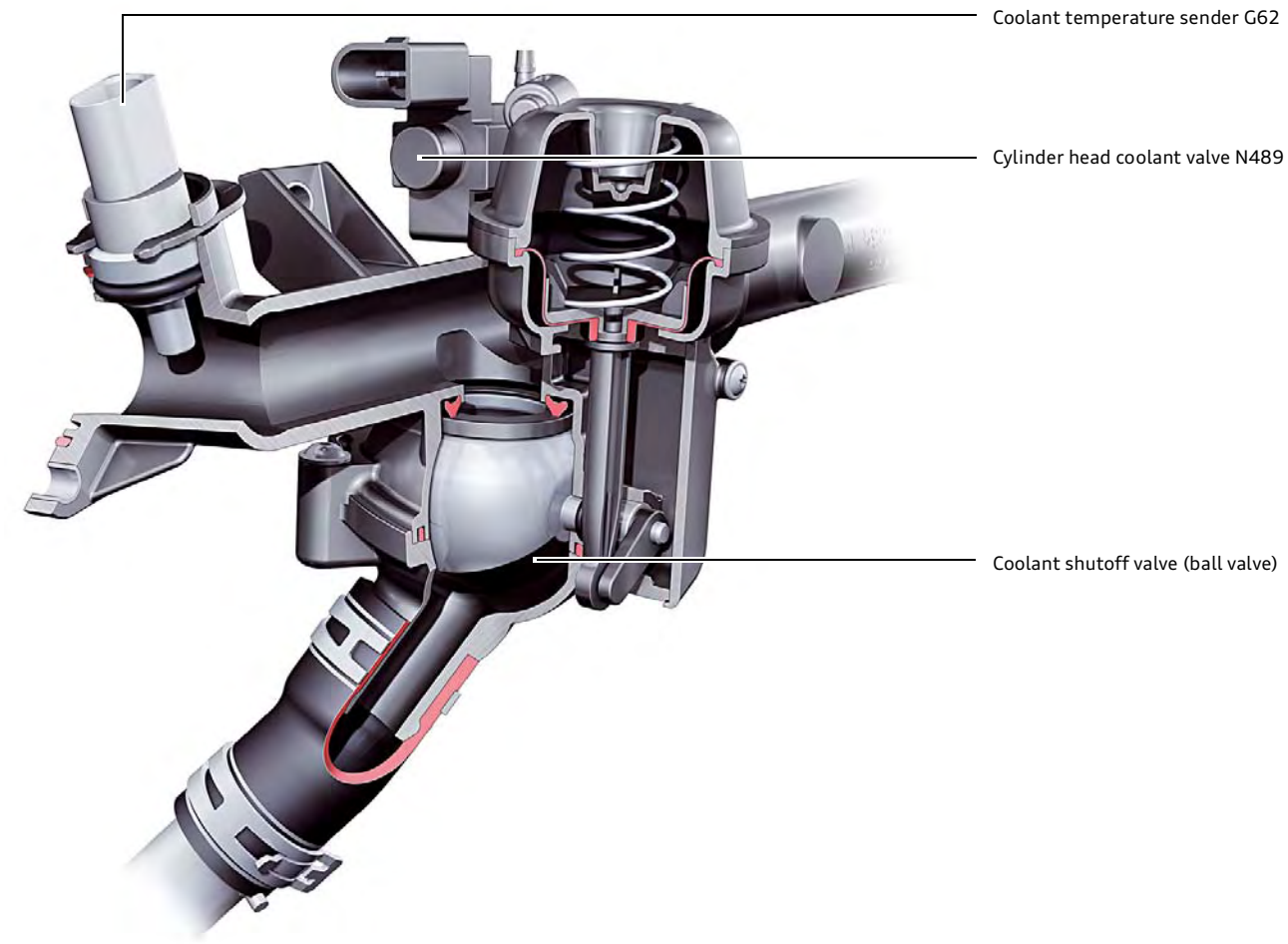
Temperature curve ITM



456_183

Circulating coolant

Coolant shutoff valve (ball valve) open



456_022

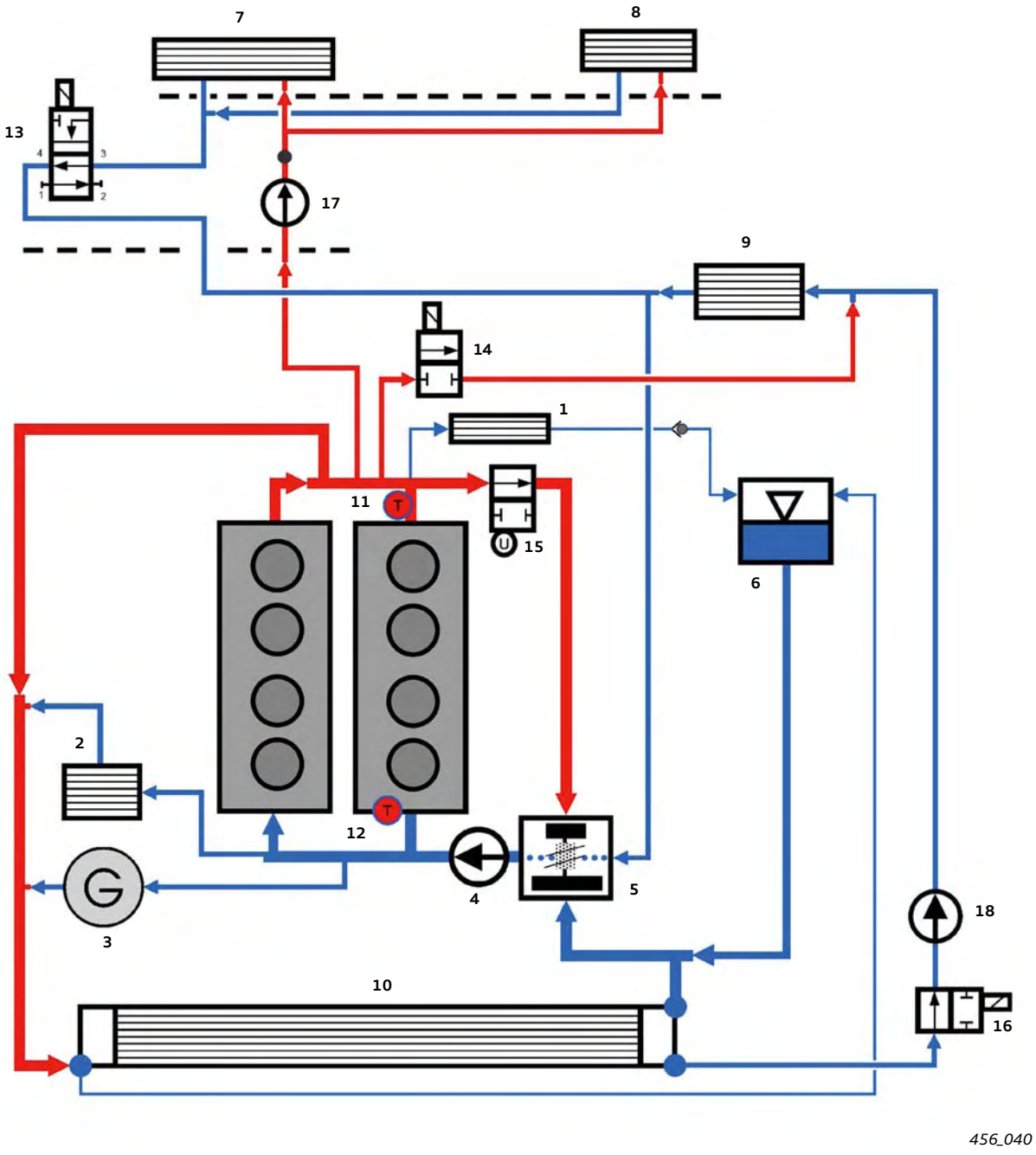
After the stationary coolant phase, the heater is usually the first to receive warm coolant. The coolant shutoff valve N82 in the heating circuit opens and quickly provides a pleasant temperature inside the vehicle.

Once the vehicle interior has reached the set temperature, warm coolant can be channelled to the gearbox. The coolant valve N488 opens and supplies the ATF heat exchanger with warm coolant. In this way, the ATF is heated more quickly, thereby reducing friction within the gearbox and saving fuel.
If the ATF overheats, the gear oil can still be cooled. In this case, the gearbox coolant valve N488 is closed and the gearbox cooling valve N509 is opened. Cool coolant is now circulated from the radiator to the ATF heat exchanger by the after-cooling pump V51.

If the heater does not need any energy to heat the vehicle interior (at warm ambient temperatures), the air conditioning control unit does not send a heating request. The engine can now run for longer than the 120 seconds with stationary coolant, after which the gear oil is immediately heated.
If the engine temperature control temperature sender G694 measures a component temperature of approx. 105 °C, the cylinder head coolant valve N488 and, with it, the coolant shutoff valve (ball valve) are opened.

To monitor the critical valve land temperatures and to avoid local overheating during the stationary coolant phase, temperature sensor G694 is installed in the cylinder head close to the combustion chamber. If map-based coolant temperatures are exceeded, the coolant shutoff valve (ball valve) is immediately opened by the engine control unit, and the secondary cooling circuit to the coolant pump is enabled.

The spring-loaded vacuum cell always opens the inlet to the coolant pump when vacuum is low.



Legend:

1 Crankcase breather heater
2 Heat exchanger for engine oil cooling
3 Alternator
4 Coolant pump
5 Thermostat for mapped cooling F265
6 Coolant expansion tank
7 Heater heat exchanger
8 Heater heat exchanger, rear
9 ATF heat exchanger
10 Radiator
11 Coolant temperature sender G62
12 Engine temperature control temperature sender G694
13 Coolant shutoff valve N82
14 Gearbox coolant valve N488
15 Cylinder head coolant valve N489
16 Gearbox cooling valve N509
17 Coolant circulation pump V50
18 Coolant run-on pump V51
(runs during ATF cooling and after-cooling phases)

Short technical description of the 4.2l V8 TDI engine in the Audi A8 ’10

Technical features

- Increase in ignition pressure to 180 bar from 160 bar.
- Steel ring carrier cast into the piston in place of a conventional salt core cooling duct for cooling the pistons with engine oil
- Corrugated 4-layer cylinder head gasket with vertically profiled stopper
- Recuperation
- Engine weight has been reduced by approx. 3 kg by reducing wall thickness, by reducing the number of bolts and using aluminium coolant tubes in place of steel coolant tubes
- Two-stage volume-flow controlled oil pump
- Honeywell Garrett turbocharger with speed sensors
- Innovative Thermal Management (ITM)
- Common rail injection system for injection pressures of up to 2000 bar, with supply-on-demand intank fuel pump (no fuel pre-supply pump required)
- Low-temperature exhaust gas recirculation (EGR)

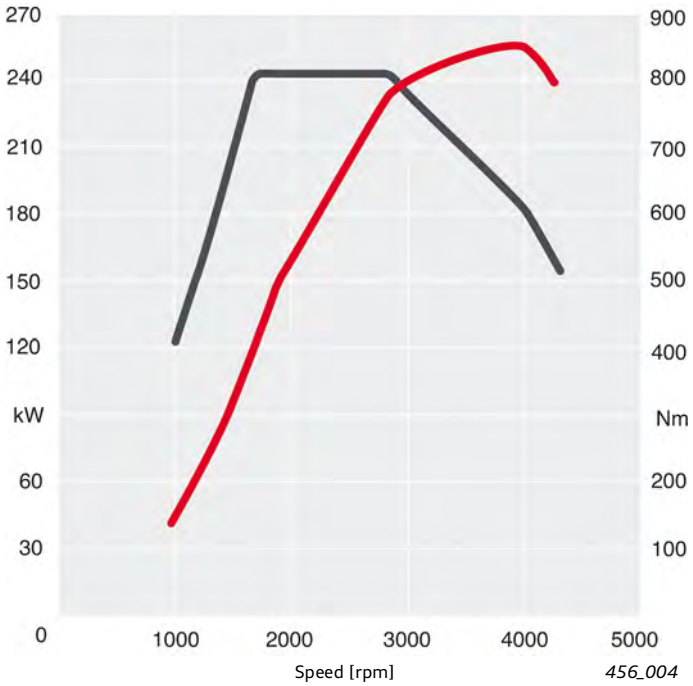
456_003

4.2l V8 TDI engine with engine code CDSA

Torque/power curve

Max. torque in Nm

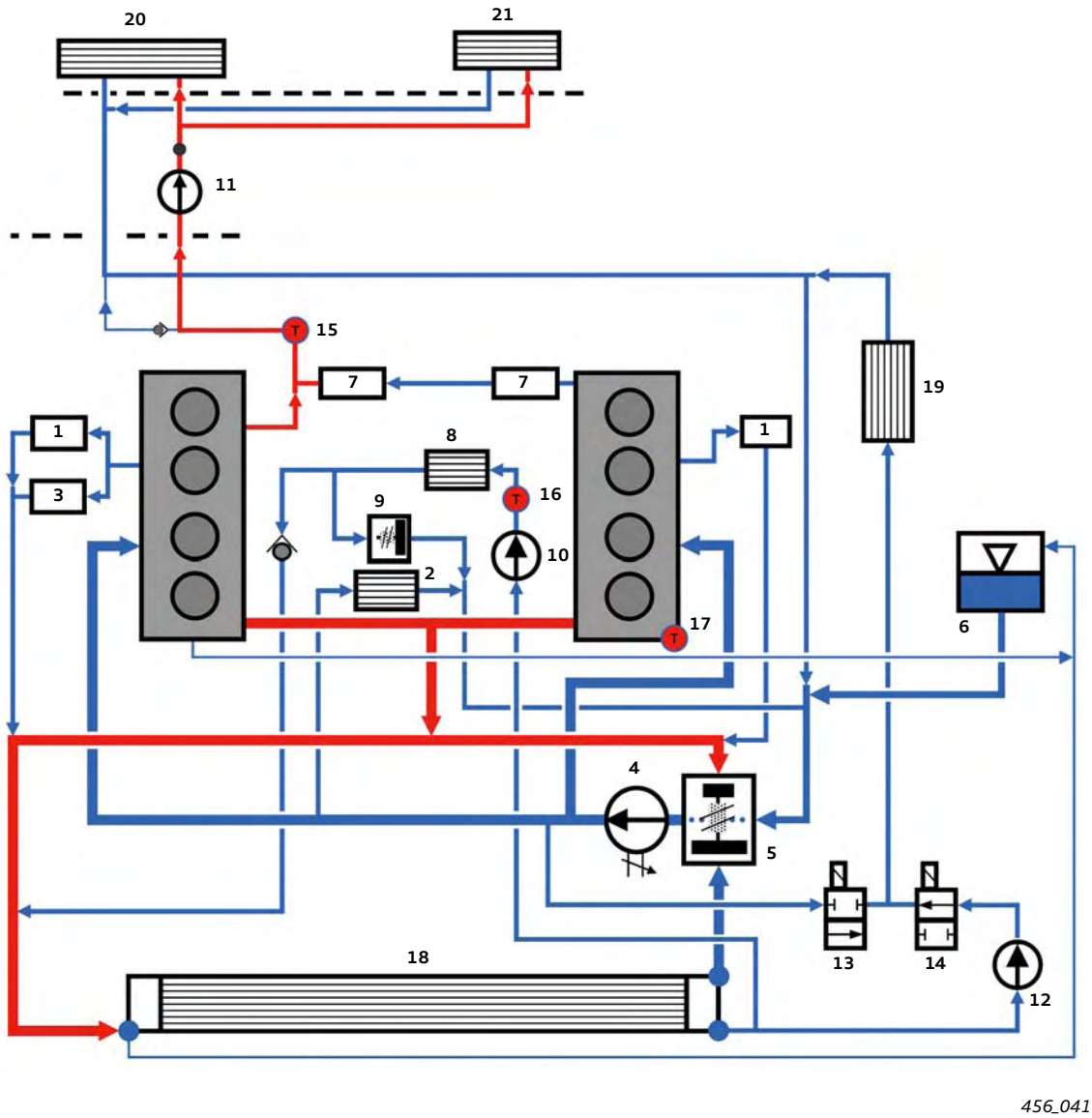
Max. power output in kW



Specifications

Engine code	CDSA
Engine type	V8 engine
Displacement in cm^3	4134
Max. power in kW (bhp)	258 (350) at 4000 rpm
Max. torque in Nm	800 at 1750 – 2750 rpm
Valves per cylinder	4
Bore in mm	83
Stroke in mm	95.5
Compression ratio	16.4:1
Firing order	1–5–4–8–6–3–7–2
Engine management	Common rail, 2000 bar (Bosch CRS 3.3)
Fuel grade	Diesel to EN 590
Exhaust emission standard	EU V

Innovative Thermal Management (ITM) in the 4.2l V8 TDI engine



Legend:

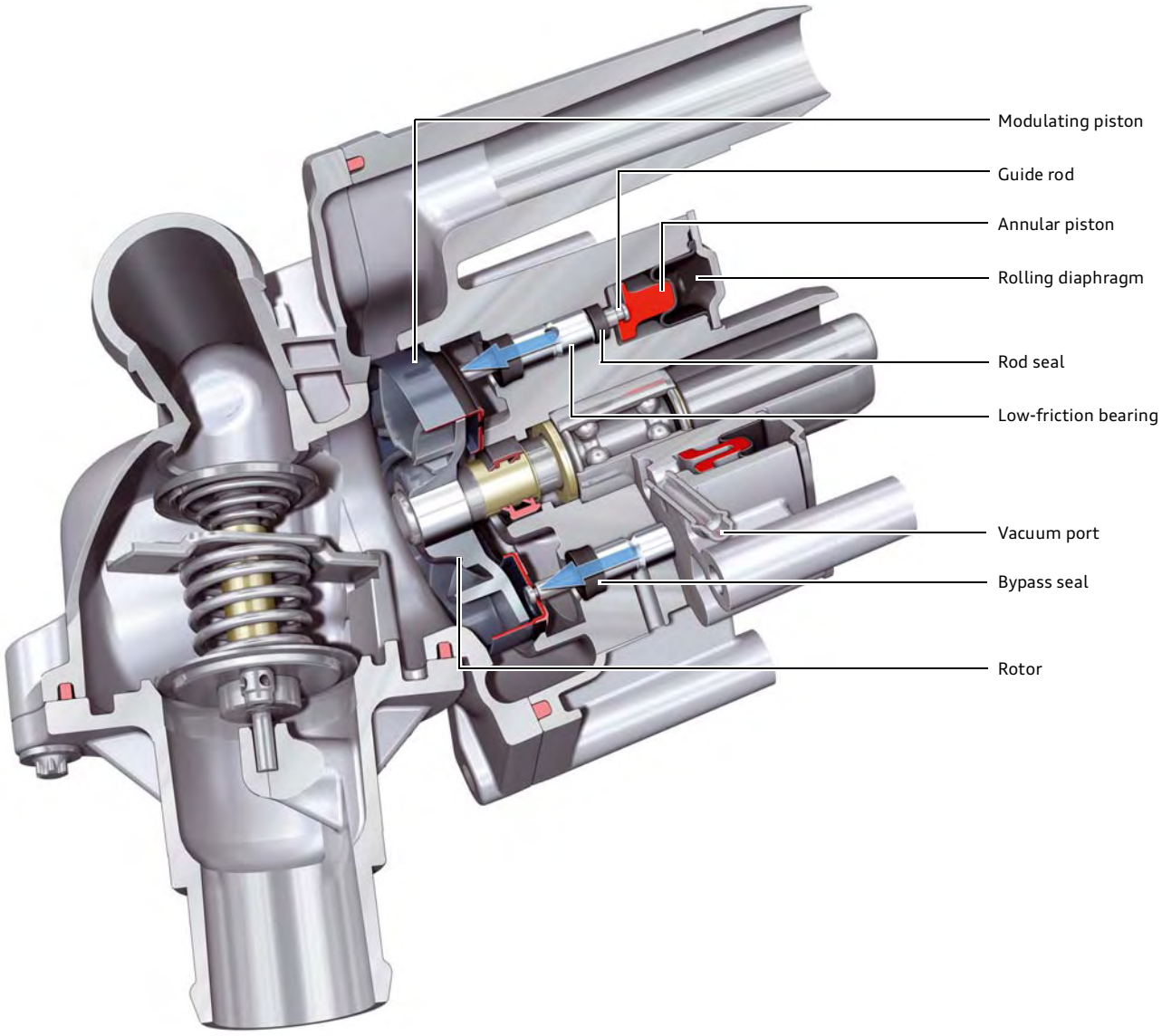
1 Exhaust turbocharger
2 Heat exchanger for engine oil cooling
3 Alternator
4 Coolant circuit solenoid valve N492 (active coolant pump)
5 Coolant thermostat
6 Coolant expansion tank
7 Exhaust gas recirculation valve
8 Exhaust-gas recirculation cooler
9 Exhaust gas recirculation coolant thermostat
10 EGR cooler pump V400
11 Coolant circulation pump V50
12 Coolant run-on pump V51 (runs during ATF cooling and after-cooling phases)
13 Gearbox coolant valve N488
14 Gearbox cooling valve N509
15 Coolant temperature sender G62
16 Radiator outlet coolant temperature sender G83
17 Engine temperature control temperature sender G694
18 Radiator
19 ATF heat exchanger
20 Heater heat exchanger
21 Heater heat exchanger, rear

Active water pump

An active coolant pump is used for the 4.2l V8 TDI engine in the Innovative Thermal Management system. When the engine is cold, a stationary coolant state is produced by means of the switchable coolant pump.
A vacuum-actuated modulating piston (bell) activated by the coolant circuit solenoid valve N492 is pushed over the rotating rotor and prevents the coolant from circulating.

The stationary coolant allows the coolant to heat up more quickly and considerably shortens the warm-up phase of the engine. After the accelerated warm-up phase, the heated coolant is transferred to the automatic gearbox in order to heat it actively. The more rapid heating of the engine and gear oil reduces the inner friction within the engine and gearbox and cuts down on fuel consumption and CO_2 emissions.

Stationary coolant



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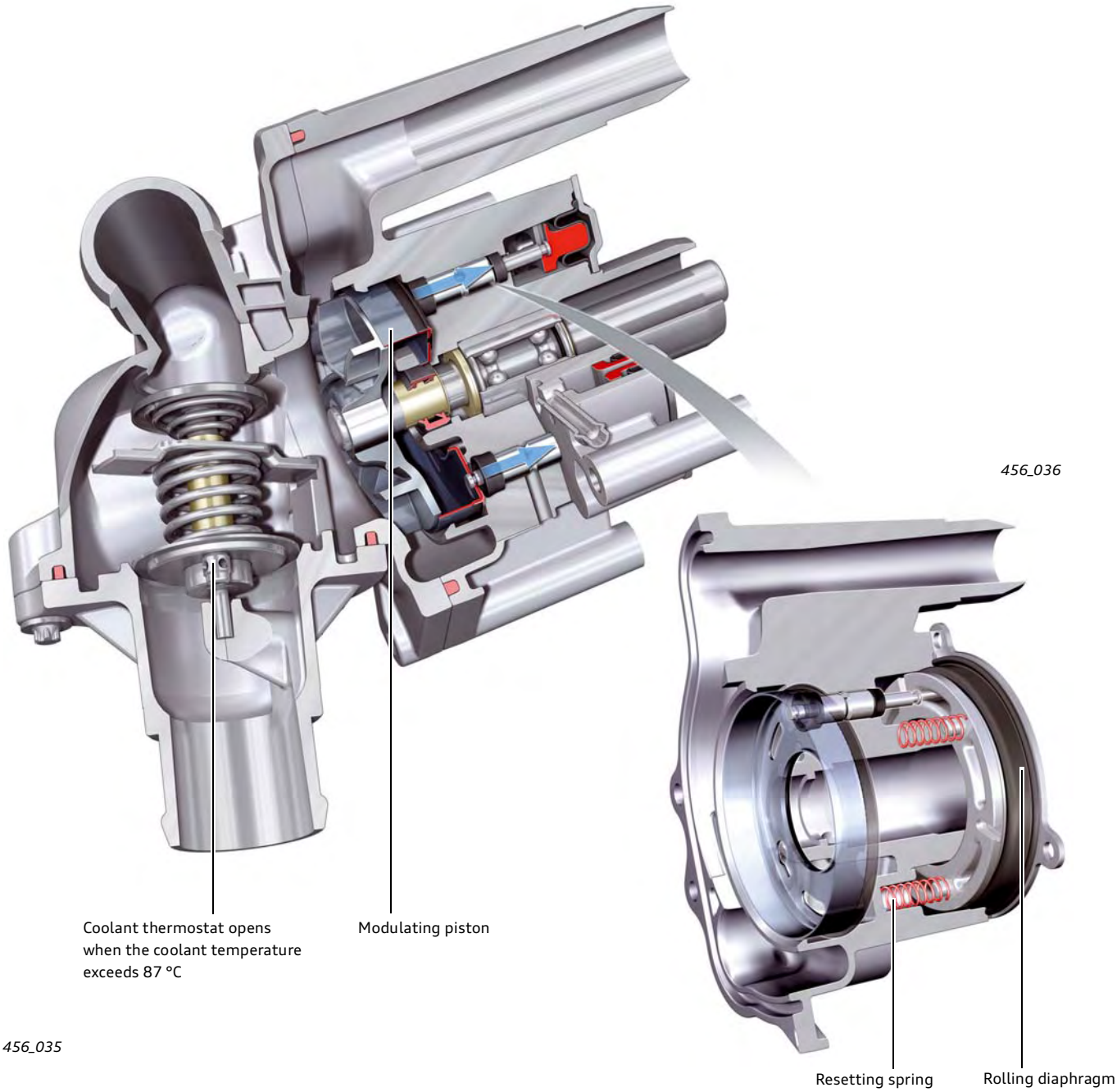
Circulating coolant

An inner spring assembly in the active coolant pump ensures that coolant is available when no vacuum is present and pushes the modulating piston into its rest position (failsafe).

The coolant is now able to circulate and heats the coolant thermostat in order to activate the primary cooling circuit.



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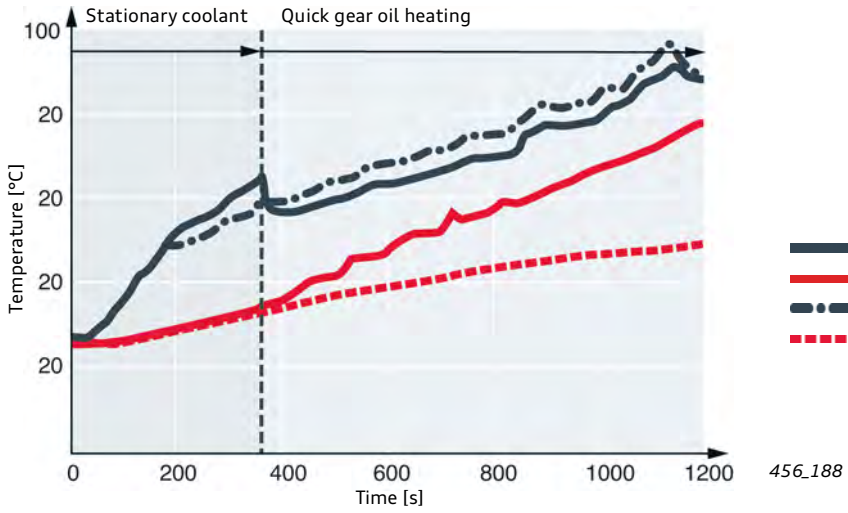

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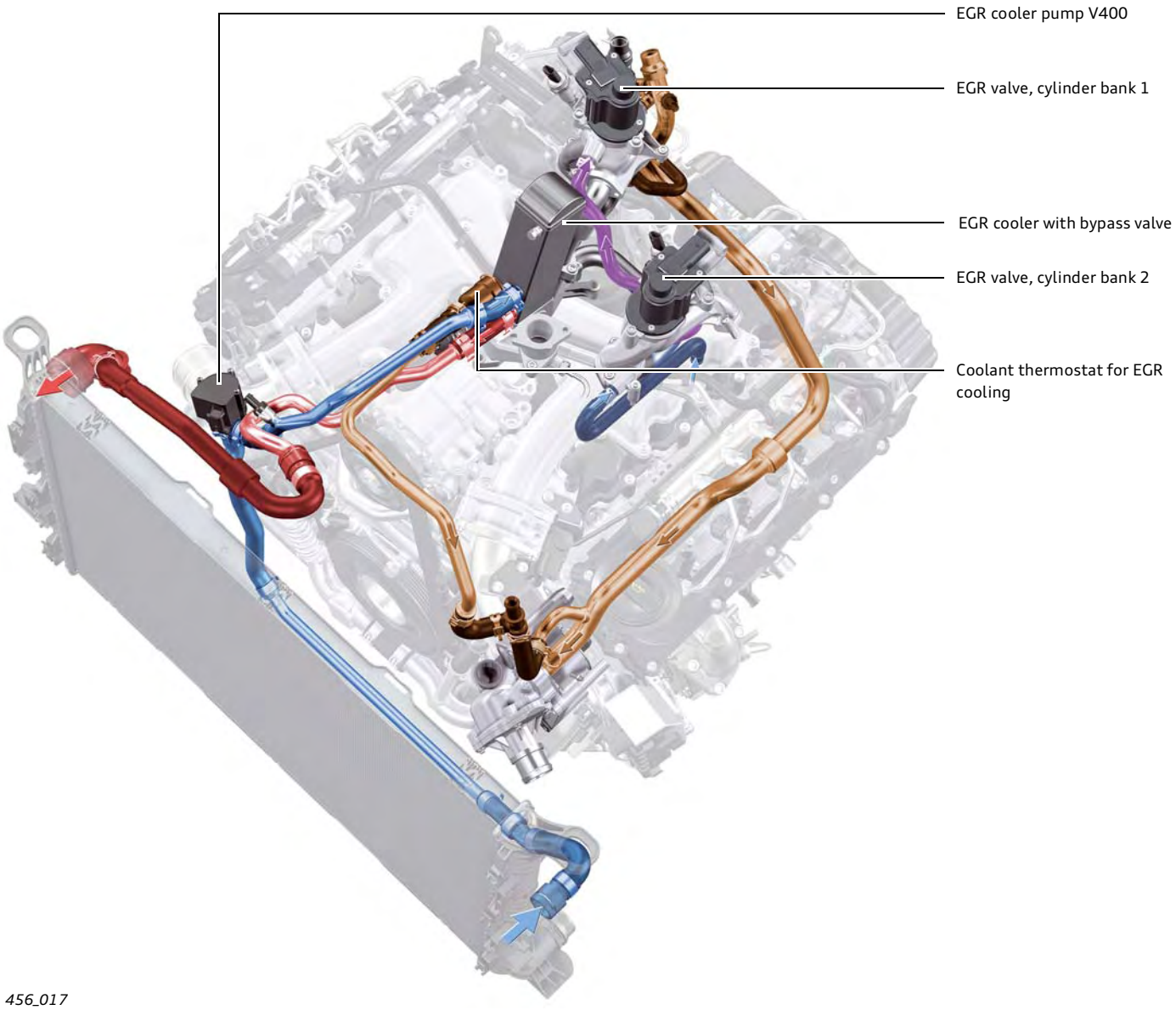
Low-temperature EGR cooling system

The U-flow EGR cooler is vacuum-actuated on the exhaust side. It is efficiency enhanced and made of stainless steel.

The EGR cooler is now integrated into its own low-temperature cooling circuit and not, like its predecessor, into the secondary engine circuit.

The low-temperature circuit is directly supplied with cool coolant from the radiator by means of the exhaust gas recirculation pump V400.
The EGR pump begins to run when the engine is started. The coolant thermostat on the EGR cooler adjusts the temperature in the EGR cooler to 55 °C. The intake of cooled exhaust gases has again been optimised for pressure loss to ensure an even distribution of recirculated exhaust gases to both cylinder banks.



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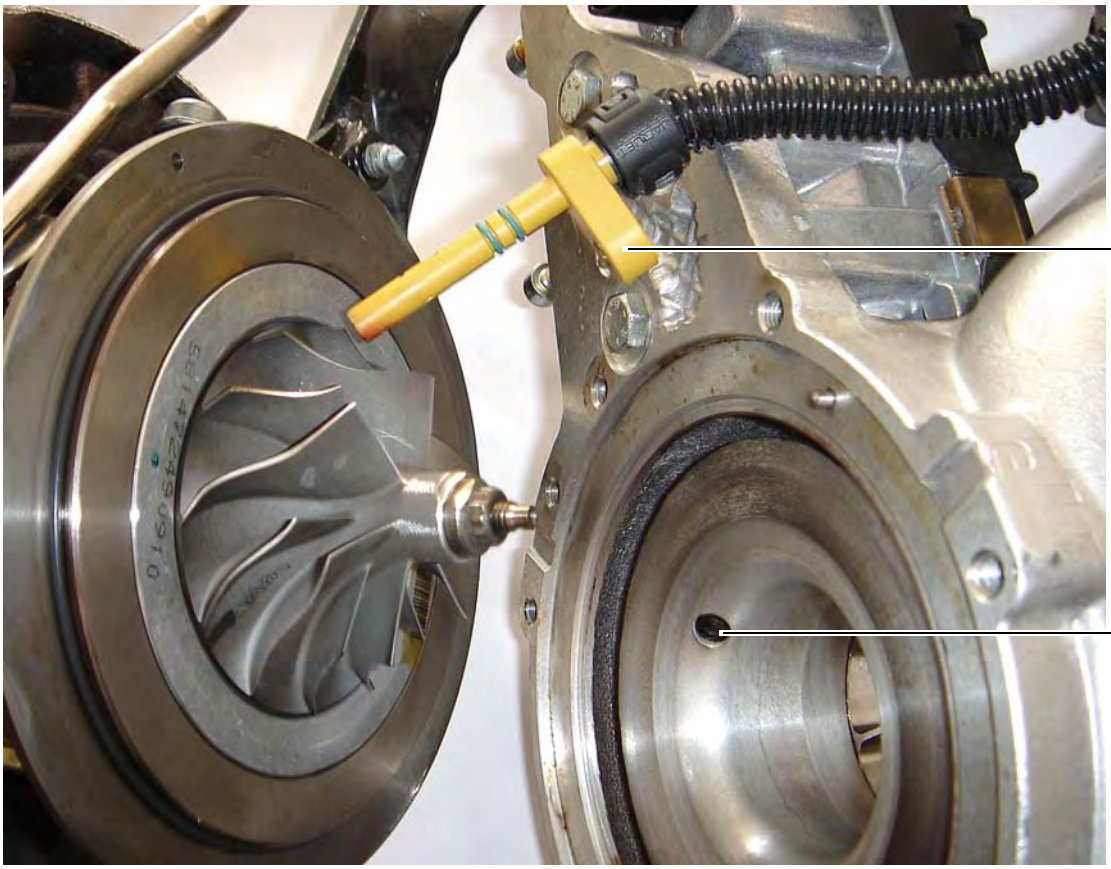
Exhaust turbocharger with speed sender



456_185

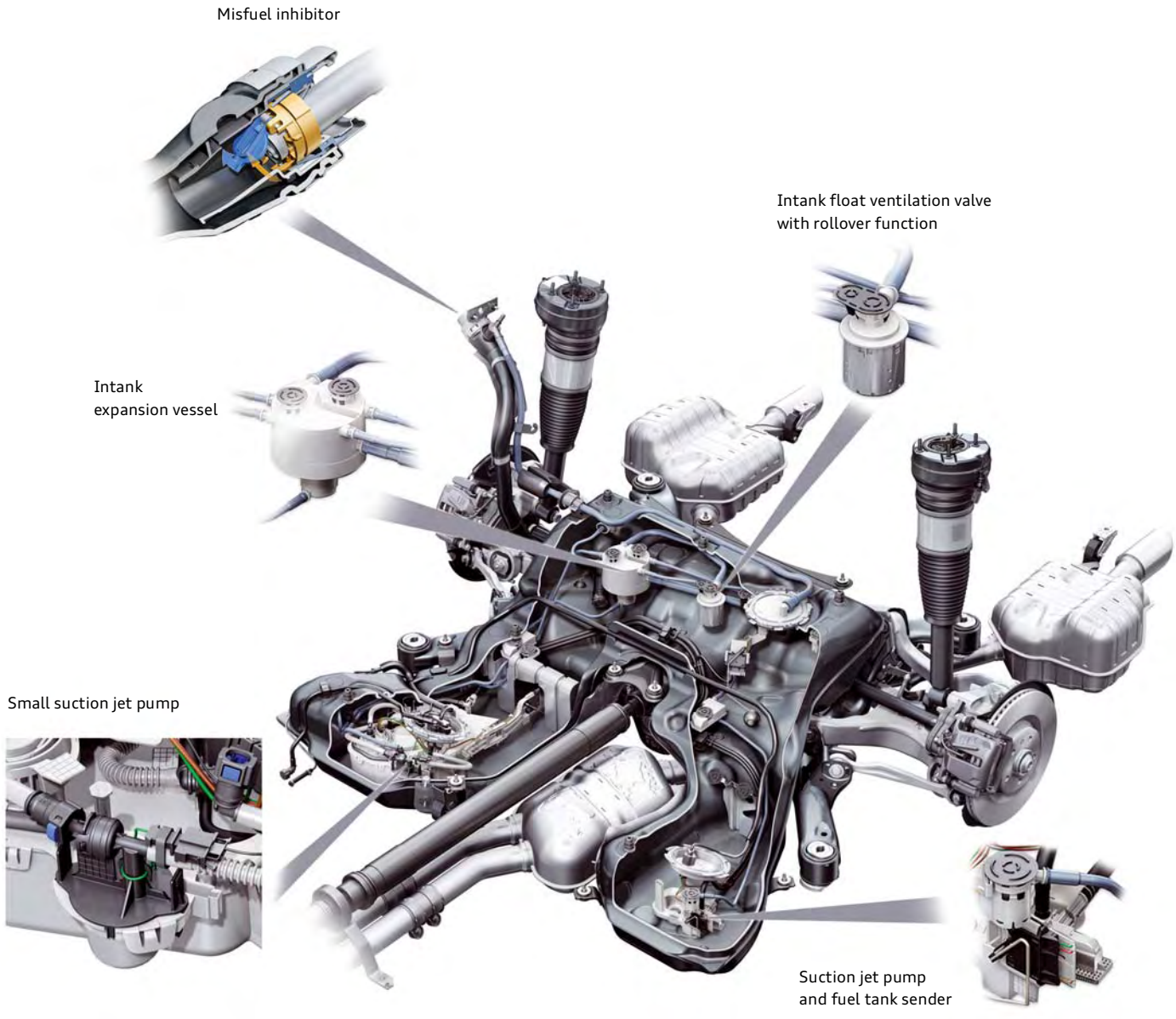
- Water-cooled Garrett VTG turbocharger with optimised compressor wheels
- High boost pressure build-up at low engine speeds
- Turbocharger speed sensors for monitoring turbocharger speed with improved software function in engine control unit:
  - for maximum torque and performance
  - Protects the turbocharger against overspeeding in conditions of extreme heat and altitude.
  - If the speed differential between both turbochargers is excessively high, the speed of both turbochargers is reduced.
  - Speed is evaluated by an electronic evaluation unit which emits one pulse per vane via the turbine wheel which, with eleven air guide vanes, acts as an encoder disc. Eleven pulses of the turbine wheel equal one revolution of the turbocharger as an RPM value for the engine control unit.

Note
For instructions for removing the exhaust turbocharger speed sender, please refer to the Workshop Manual.

Fuel tank of the Audi A8 ’10

For the first time, the HD polyethylene fuel tank is manufactured using the TSBM process (Twin Sheet Blow Moulding) in which the intank components are welded directly onto the plastic tank halves during the blowing process only seconds before both tank halves are joined together. This offers significant benefits (e.g. reduced hydrocarbon emissions) because the tank chamber requires fewer openings for valves and the welding and assembly line downstream of the blowing process is much simpler.
When the tank capacity of about 90 litres is reached, an intank float vent valve with rollover function floods causing the fuel nozzle to cut out.
A lever-type sensor is integrated in each tank half and another lever-type sensor in the upper section of the fuel tank indicates when the tank is full. This ensures that the fuel level is indicated consistently throughout the tank.

An expansion vessel integrated in the fuel tank prevents the discharge of fuel and temperature-related fuel expansion when the vehicle is driven dynamically. This expansion vessel is drained continuously during vehicle operation by a small suction jet pump.
For the first time in diesel systems, a brushless 3-phase AC pump facilitates better demand-based rail inlet pressure regulation via the fuel pump control unit J538, as well as advanced diagnostics of the whole fuel delivery system.
The 4.2l V8 TDI engine therefore does not need a fuel pre-supply pump to supply the high-pressure pump.
TDI vehicles are also fitted with a so-called misfuel inhibitor which allows only the larger fuel nozzles of diesel pumps to open the blocking mechanism.



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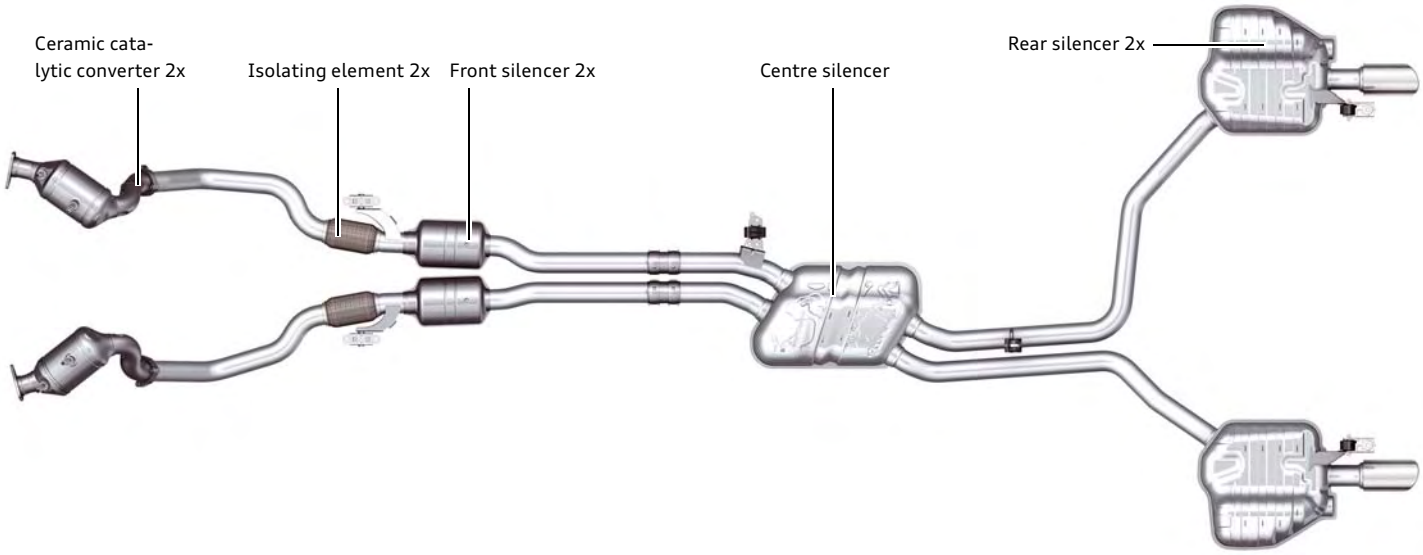
Exhaust system of the 4.2l V8 FSI engine version



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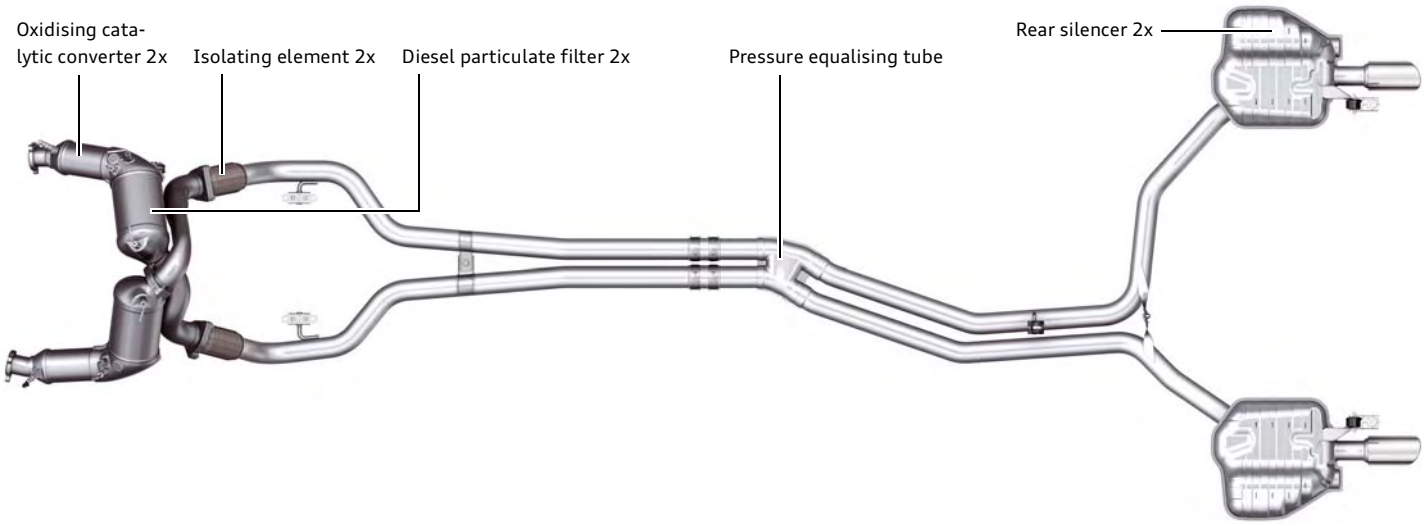
Exhaust system of the 4.2l V8 TDI engine version



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0BK gearbox and 0BL gearbox in Audi A8 ’10

The 0BK gearbox and the 0BL gearbox are the first representatives of the latest eight-speed multistep automatic gearbox.
Common features are:

- the 8 forward gears and the reverse gear are implemented using 4 planetary gear sets and 5 shift elements
- minimised drag losses because three shift elements are closed in each gear
- mechatronics for "shift-by-wire" with electro-hydraulic parking lock
- 8 gears with a ratio spread of 7 allow small gear steps, high starting ratios and high speed at low RPM
- ATF supply by means of a chain-driven vane pump
- lubrication of the transfer case by the oil pump
- the gearbox shifts into neutral when the vehicle is stationary and the engine is idling (neutral idle)

0BK gearbox

456_137

0BL gearbox

456_138

Splined prop shaft

For the first time, an innovative, new prop shaft coupling is used. The prop shaft is mated to the gearbox output shaft and locked into a slot by means of a spring sleeve. The connection is secured axially by the clamping force exerted by the clamp.

Centre differential

A new version of the self-locking centre differential with asymmetric/dynamic torque split is used in the 0BK/0BL gearbox. For more information, refer to SSP 429 (page 22 ff.).

Reference
For more information, refer to Self-Study Programme 457 "Audi A8 ’10 Power transmission".

Suspension system

One of the fundamental objectives for the development of the chassis of the new Audi A8 ’10 was to exceed the high standards set by the outgoing model in terms of driving dynamics and ride comfort.
For this purpose, proven systems such as the five-link front axle, the trapezoidal link rear axle and the adaptive air suspension system were systematically improved and incorporated into the new luxury class model.

The degree of networking of the systems was considerably increased. By using the powerful FlexRay bus system, it is possible to employ a central sensor unit which provides information on vehicle movements to the relevant systems - such as ESP, adaptive air suspension, dynamic steering and the sport differential. This has enabled the number of in-vehicle sensors to be significantly reduced.

Like the previous model, the new Audi A8 ’10 is exclusively available with adaptive air suspension.

The following suspension system versions are available for the Audi A8 ’10. The standard suspension system (adaptive air suspension) with production control number 1BK is standard equipment.
The sports suspension (adaptive air suspension sport) 2MA is optional equipment for customers who prefer a sportier driving style. In vehicles with a sport suspension, ride height is 10 mm lower than with the standard suspension.
Again, the sporty 2MB suspension system is used for the Audi S8. It has the same ride height as sport suspension 2MA. For rough road markets, the 1BY heavy-duty suspension is available as a substitute for the standard suspension. It has 8 mm higher ride height than standard suspension 1BK. In addition, vehicles with heavy-duty suspension have a reinforced engine guard on the front axle.

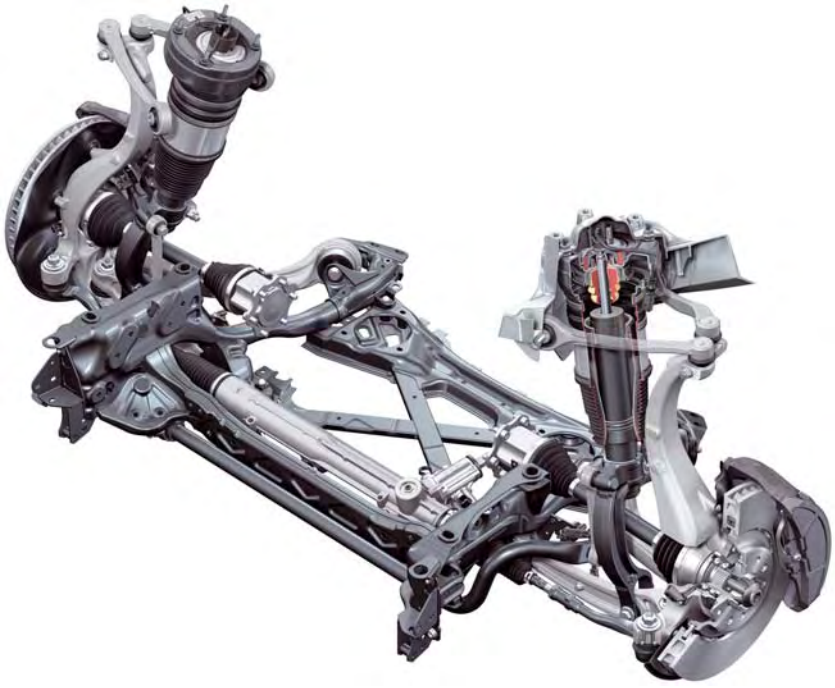
456_172

Reference
For more information, refer to Self-Study Programme 458 "Audi A8 ’10 Suspension system".

Front axle

The basis for the development of the front axle was the five-link front axle used in the current Audi A4. A key advantage of this concept is the position of the steering gear on the subframe in front of the axle.

The steering gear can be precision-fitted with very low tolerances. Therefore, no toe-in curve is needed for tolerance compensation (as implemented already in the Audi A4).



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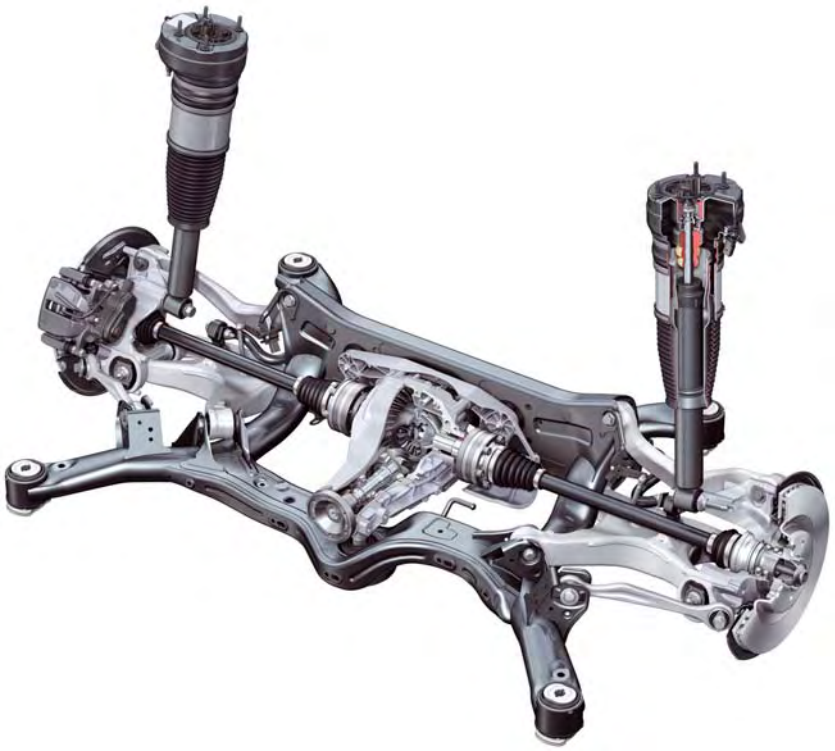
Rear axle

The concept of the self-tracking trapezoidal-link axle was also the basis for the development of the rear axle in the Audi A8 '10. This concept has been fundamentally revised compared to the outgoing model. The suspension strut is now supported directly by the wheel carrier.

Damper response is significantly better thanks to a more direct ratio of 0.9 (compared to 0.74 in the outgoing model). The axle carrier isolates the axle components from the body by means of four large hydraulic bearings. All wheel-locating components are of lightweight aluminium.



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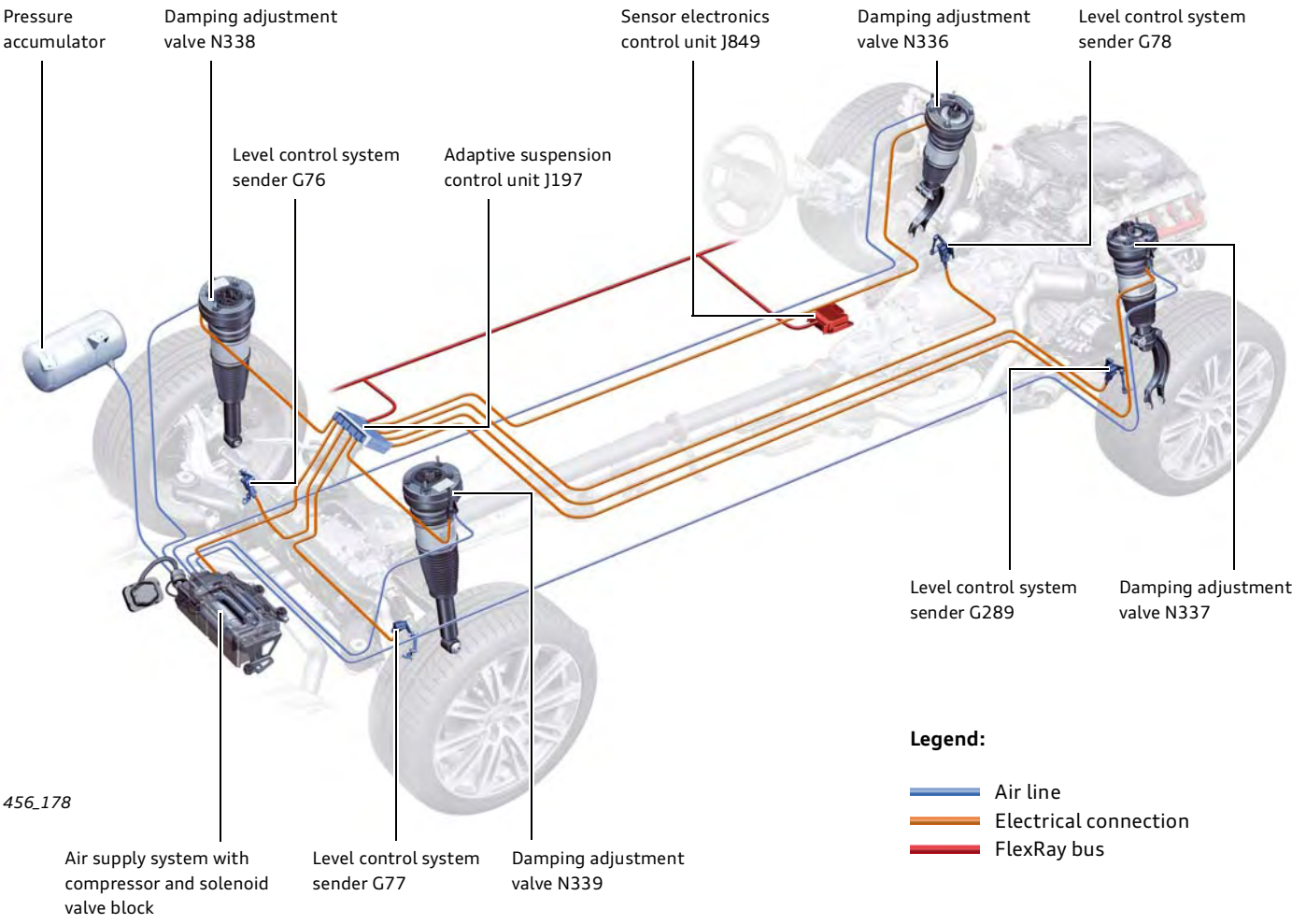
adaptive air suspension (aas)

One of the primary development goals for the air suspension system of the Audi A8 ’10 was to achieve "best in class" ride comfort and driving dynamics. All key system components were redesigned in order to achieve this goal. The control logic is different depending on suspension system.

One of the main new features is the integration of the body acceleration sender into the sensor electronics control unit.
The adaptive suspension control unit communicates with FlexRay via the data bus system. In the Audi A8 ’10, both display and operation have been integrated into Audi drive select.



Brake system

The brake system of the Audi A8 ’10 is a logical advancement on the brake system in the outgoing model. 17 and 18 inch brake systems will be used at start of production.

A significant reduction in weight and outstanding braking performance in any driving situation have been achieved by the application of lightweight design.

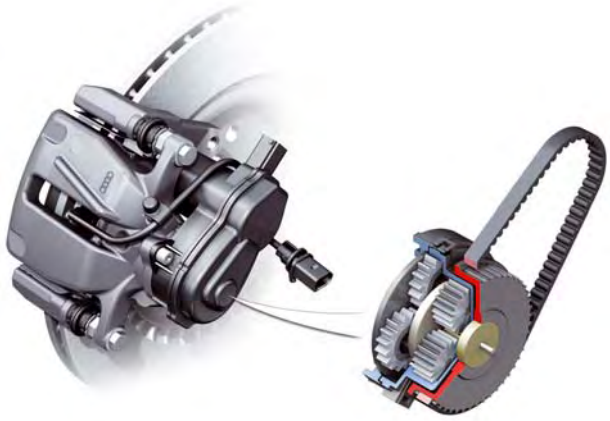
	Front axle		Rear axle	
Engine	4.2l V8 FSI	4.2l V8 TDI	4.2l V8 FSI	4.2l V8 TDI
Brake type	17 inch 2FNR 42 AL Aluminium floating frame caliper	18 inch 2FNR 42 AL Aluminium floating frame caliper	17 inch CII 42 EPB Aluminium floating caliper	18 inch CII 42 EPB Aluminium floating caliper
Number of pistons	2	2	1	1
Piston diameter	2 x 42 mm	2 x 42 mm	43 mm	43 mm
Brake disc diameter	356 mm	380 mm	330 mm	356 mm

456_174

Front axle brake discs

Pin brake discs with aluminium drum are used in an Audi luxury-class model for the first time. This concept is mainly used in sports cars because it offers a significant advantage in terms of weight. It reduces the weight of the 17-inch brake disc by approximately 2.8 kg and the weight of the 18-inch brake disc by approximately 3.8 kg.

The brake disc friction ring consists of a special new cast iron material. The friction ring is connected to the aluminium drum by stainless steel pins.



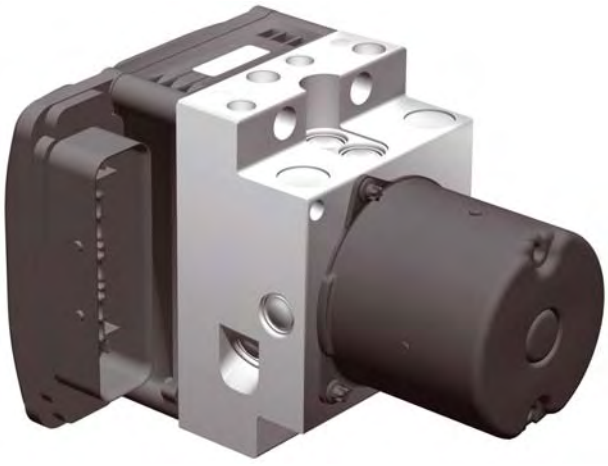
456_173

Rear axle brake system

The tried and tested "Colette II" brake calipers were conceptually adopted from the outgoing model. The diameter of the brake discs is considerably larger than on the previous model.

Electromechanical Parking Brake (EPB)

The concept of parking brake motors with planetary gearing was adopted from the current A4, A5 and Q5 models for the Audi A8 '10.



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The Audi A8 '10 features a new generation of the Bosch ESP system: ESP Premium. The hydraulic capacity of the brake system has been greatly increased through the use of an improved pump for active pressure build-up.
Higher electronic capacity is achieved by using the FlexRay data bus for data communications and by extensive networking of numerous control systems.

456_176

The Audi A8 '10 uses the sensor electronics control unit J849 for the first time. This control unit includes sensors for monitoring all movements of the vehicle. The control unit interfaces with the FlexRay bus, enabling other control units to make direct use of measurement data. Vehicle movements are monitored centrally to cut cost and reduce complexity. A high degree of networking between control units and rapid data transfer are achieved by using the FlexRay bus for data communications.

The control unit has sensors for monitoring vehicle acceleration in the x, y and z directions and vehicle rotation about the x, y and z axes. It replaces ESP sensor unit G419 and the body acceleration senders of the adaptive air suspension system.

Steering system

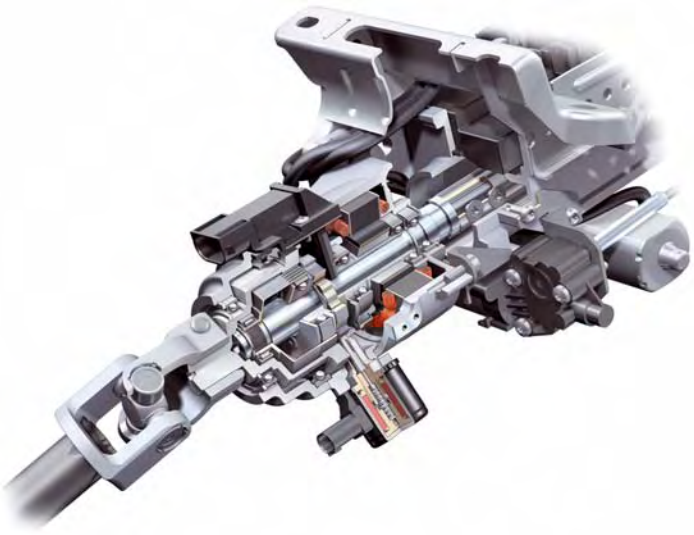
The Audi A8 ’10 employs the long-established Audi hydraulic rack and pinion steering concept in combination with an electrically adjustable steering column.
Dynamic steering is optional. Servotronic speed-sensitive steering is standard. The steering gear, steering column and steering wheels are new developments.

A major change compared to the previous model is the positioning of the steering gear on the subframe in front of the front axle. This provides much more direct steering response.

456_170

Dynamic steering

Dynamic steering is also optional in the Audi A8 ’10. In terms of its design and function, this system is identical to that of the Audi A4. It also has the same servicing requirements.



456_171

adaptive cruise control (ACC)

The Audi A8 ’10 features a new generation of the Bosch ACC system. Two ACC sensors are used at the front left and right for the first time. It is now possible to monitor vehicles ahead and behind by using the Audi lane assist video camera, the rear radar sensors for Audi side assist and the ultrasonic sensors of the Audi parking system.

If the vehicle is fitted out with a navigation system, the ACC also makes use of current route data. This has led to a quantum leap in terms of system functionality. These functions are implemented through the interaction of numerous control units. Like its predecessor, the ACC system is optional and available for all engine/gearbox configurations.

Front view of vehicle with ACC sensors

456_177

ADC sender, right G259 and ACC control unit J428

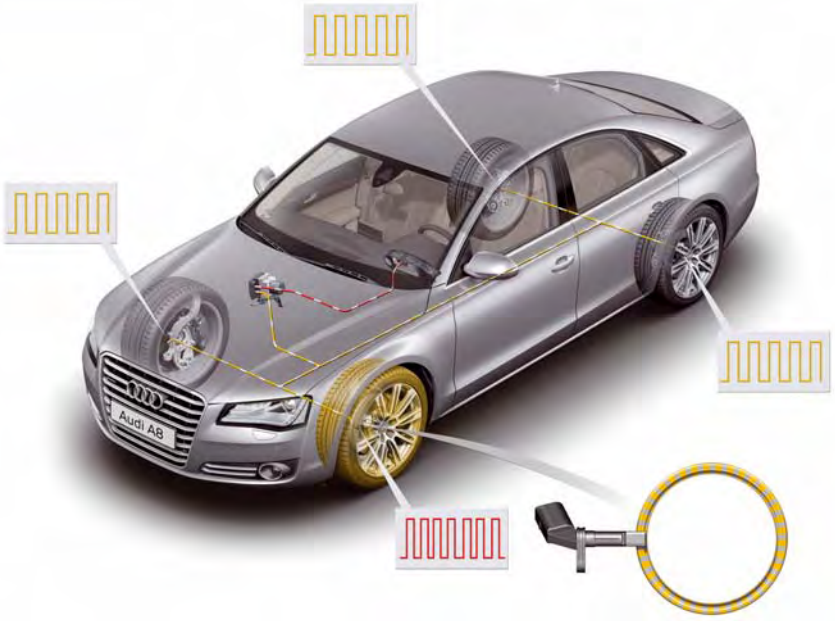
ADC sender, left G258 and ACC control unit 2 J850

Wheels and tyres

At the start of production, the Audi A8 ’10 with V8 4.2l FSI engine will be equipped as standard with 17-inch forged aluminium wheels. 18 inch cast aluminium wheels will be standard with the V8 4.2 TDI engine. 19 and 20 inch wheels are optionally available. Tire Mobility System (TMS) is standard and 19 and 20 inch spare wheels are optional.

Low tyre pressure indicator

The second-generation tyre pressure monitoring display is also optional in the Audi A8 ’10. The system in the Audi A8 ’10 is identical to those used in other Audi vehicles in terms of its design and function, operation, driver information and servicing requirements.



456_179

Electrical system

Convenience electronics in the Audi A8 ’10

Dash panel insert

The dash panel insert in the Audi A8 ’10 is a new development designed to meet the higher demands on in-car displays A high-resolution 7-inch colour display in the direct view of the driver provides all the relevant driver information.

The new visualisation functions of the colour display are used, among other things, for the display of high-quality 3D navigation graphics and moving images from the Audi night vision assist system. The display has a resolution of 800x480 pixels.

456_100

It also features an entirely new operating and display concept. A new taskbar at the top of the display enables content to be called up quickly on the colour display.

It offers a clear structuring of content and straightforward layout. The display can be operated using the buttons on the standard multifunction steering wheel.

456_182

Analogue clock

The Audi A8 ’10 comes as standard with an analogue clock integrated into the centre console. It communicates with the dash panel insert via a LIN bus.

If the ignition is on, the analogue clock continuously receives time signals from the dash panel insert. After the ignition is turned off, the analogue clock continues to operate independently.

Background lighting

Background lighting is optional in the Audi A8 '10 and is a highly refined version of the standard interior lighting. The customer can choose from any of three colour profiles at the MMI control unit. Each colour profile creates a unique sense of atmosphere in the vehicle interior.

The following three colour profiles are available:

- Polar – a technical, cool and formal light
- Ivory – a warm white light which creates a feel-good atmosphere in the vehicle interior
- Ruby – a mixture of Polar and red light which accentuates the vehicle's sporty character

Colour profile: Polar

456_105

Colour profile: Ivory

456_106

Colour profile: Ruby

456_107

Background light module

The background light module is referred to as convenience control unit 2 – J773 and is the master background lighting control unit. It is only available in combination with the optional background lighting package. Some background lights are activated directly by control unit J773. Other background lights are activated by the roof electronics control unit and the door control units, which receive corresponding commands from J773 via the CAN bus.

The brightness level of the background lighting can be adjusted separately for each zone at the MMI control unit. For this purpose, the vehicle is divided into four zones: top front, bottom front, top rear and bottom rear. To set the desired brightness level, the control units adapt the duty cycle of the pulse-width modulated signal (PWM signal) accordingly.

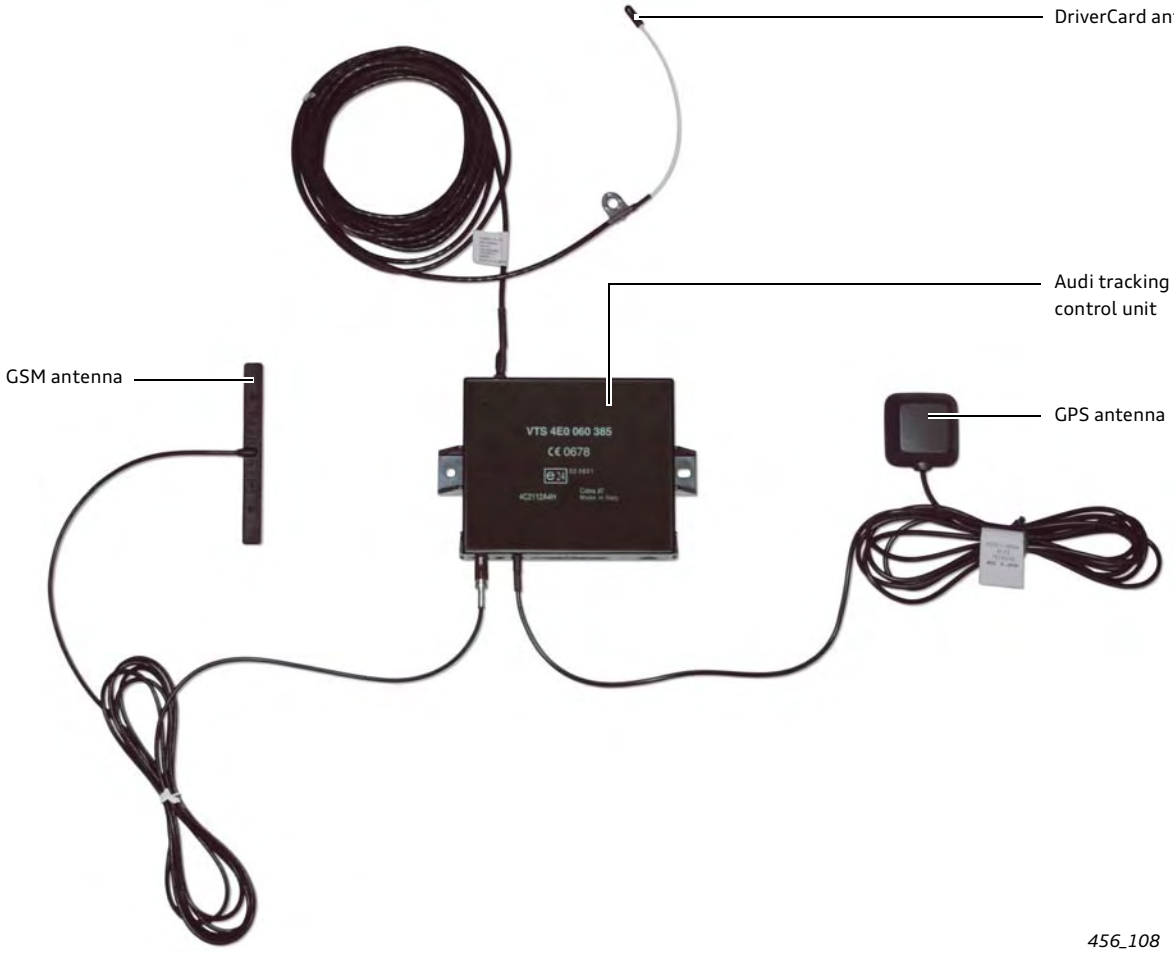
Audi Tracking Assist

If a vehicle is stolen, Audi tracking assist helps in two ways:

- quick detection of theft and
- subsequent recovery of stolen vehicle by vehicle tracking

A stolen vehicle is located by a so-called Service Operating Centre (SOC), which communicates with the tracking assist system via a GSM interface. All European countries already have such an SOC, which means that a stolen vehicle can even be tracked across national borders throughout Europe.

Audi tracking assist is available in two different versions: a basic version and a plus version.
Being a "stand-alone" solution, the basic version is not integrated in the vehicle networking system. The plus version is integrated in the vehicle networking system. It can, therefore, respond to the triggering of the antitheft alarm and prevent restarting of the vehicle after a theft is detected.
Implementation of the restart inhibitor is, however, heavily dependent on the national legal situation, hence this system is not available in all countries.



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Audi tracking assist is exclusively distributed as a retrofit solution through Audi Genuine Accessories.
A vehicle does not have to meet any special requirements for retrofitting of Audi tracking assist. To retrofit an Audi tracking assist plus system, however, the vehicle tracking interface control unit J843 must be factory-fitted in the vehicle.

This control unit can be ordered as optional equipment with all new Audi vehicles.
The interface control unit cannot be retrofitted.

Reference
A separate Self-study Programme has been prepared covering the convenience electronics in the Audi A8 ’10 and the Audi tracking assist system: Self-Study Programme 460. This SSP deals with the new features of the convenience electronics and describes how the Audi tracking assist system works.

New driver assistance systems in the Audi A8 ’10

The Audi A8 ’10 offers a new image processing system comprised of one or two control units depending on specification.

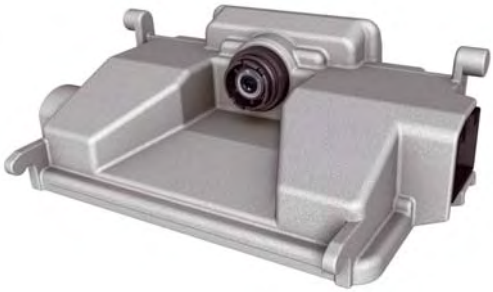
The control units are as follows:
1. Image processing control unit J851
2. Camera control unit J852

Image processing control unit J851

456_109

The image processing control unit J851 is an all-new control unit. Functions used by ACC Stop & Go are integrated in it. In future, the Traffic Sign Recognition function will also be integrated in this control unit, but will not be available with the Audi A8 ’10 at the start of production.

Camera control unit J852



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The camera control unit J852 replaces the previous Audi lane assist control unit J759. Thanks to its more powerful CPU, it also performs the functions of the Audi lane assist system, and even the intelligent light function.

Intelligent light system

The intelligent light system gives the driver the best possible road illumination at night without dazzling other road-users. The function is a further development of the headlight assist system. Whereas the headlight assist system is entirely digital, the intelligent light system adjusts the range of the headlights continuously between dipped beam and main beam according to the momentary ambient conditions and the traffic situation. The camera in the control unit J852 recognises oncoming traffic and vehicles driving ahead.

The intelligent light system also utilises navigation data. If the Audi A8 ’10 is fitted out with a navigation system, the intelligent light system is provided with information on the road ahead of the vehicle. This information helps the intelligent light system, for example, to recognise the road type more quickly and to react appropriately. The navigation data also tells the intelligent light system whether the vehicle is approaching a road intersection. If so, an additional intersection light is activated.

Illumination of the road without intersection light

456_098

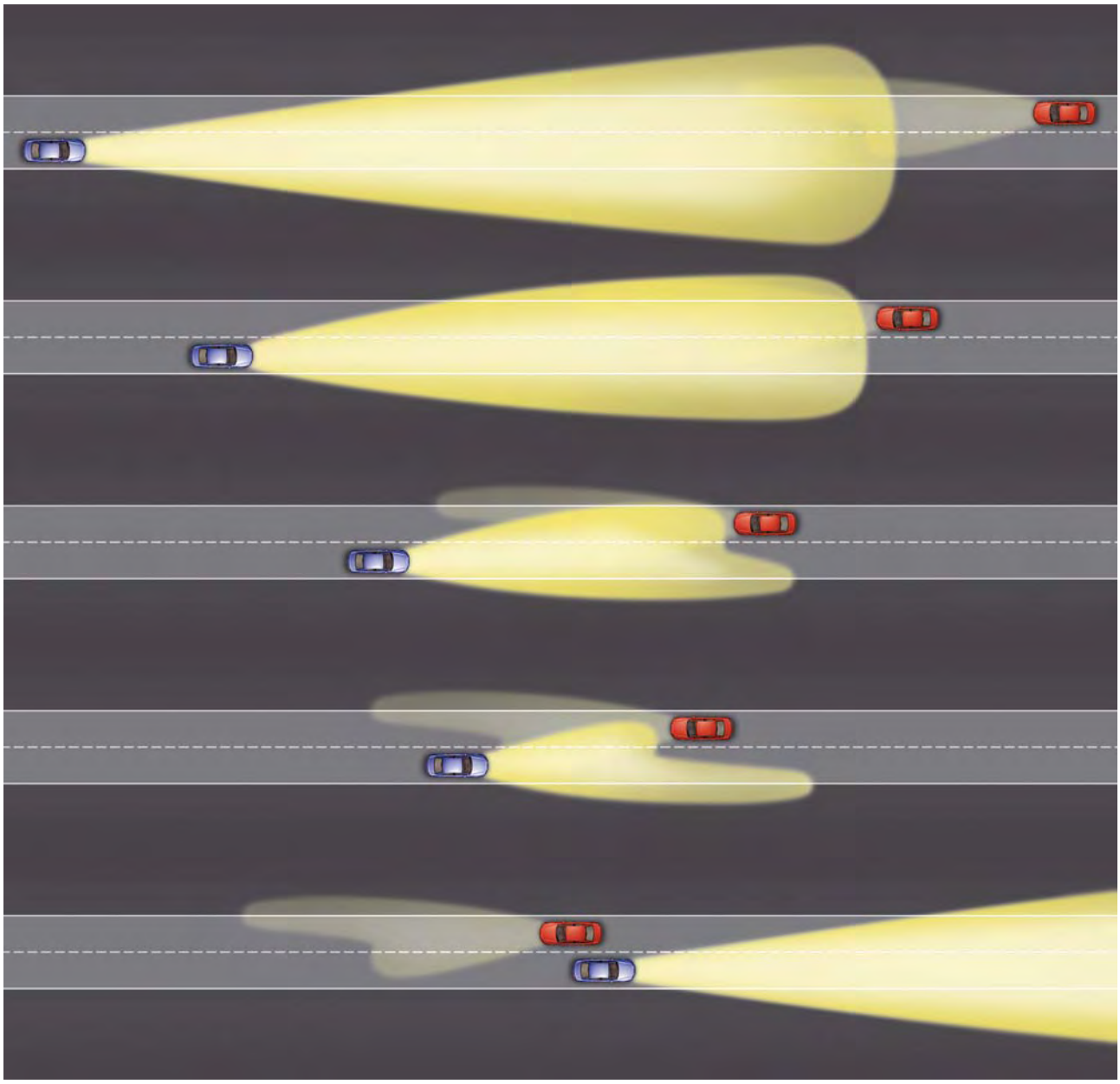
Illumination of the road with intersection light

456_099

Response of intelligent light system to oncoming vehicle

If an oncoming vehicle is detected, the intelligent light system lowers the headlights to the dipped-beam position in order to avoid dazzling the oncoming traffic.

After the oncoming traffic has passed, traffic situation permitting, the headlight range is again increased until the headlights are in the main-beam position.



456_111

Reference
A Self-study Programme has been published covering the driver assistance systems in the Audi A8 '10: Self-Study Programme 461. This SSP describes the control units of the new image processing system and shows the new intelligent light system with and without navigation assistance.

Audi night vision assist

The new Audi A8 ’10 is the first Audi model to be equipped with night vision assist - a driver assistance system that enables the driver to spot potential hazards more quickly at night.

The system shows a thermal image of the area in front of the vehicle on the multifunctional display. An infrared camera is used for imaging purposes. It is integrated in the Audi rings on the front end of the vehicle.

456_102

456_103

Because of the heat they give off, human beings and animals show up much more brightly in the image than their surroundings and, therefore, are easier for the driver to spot on the display. If the system classifies an object as a human being, it is additionally highlighted in colour.

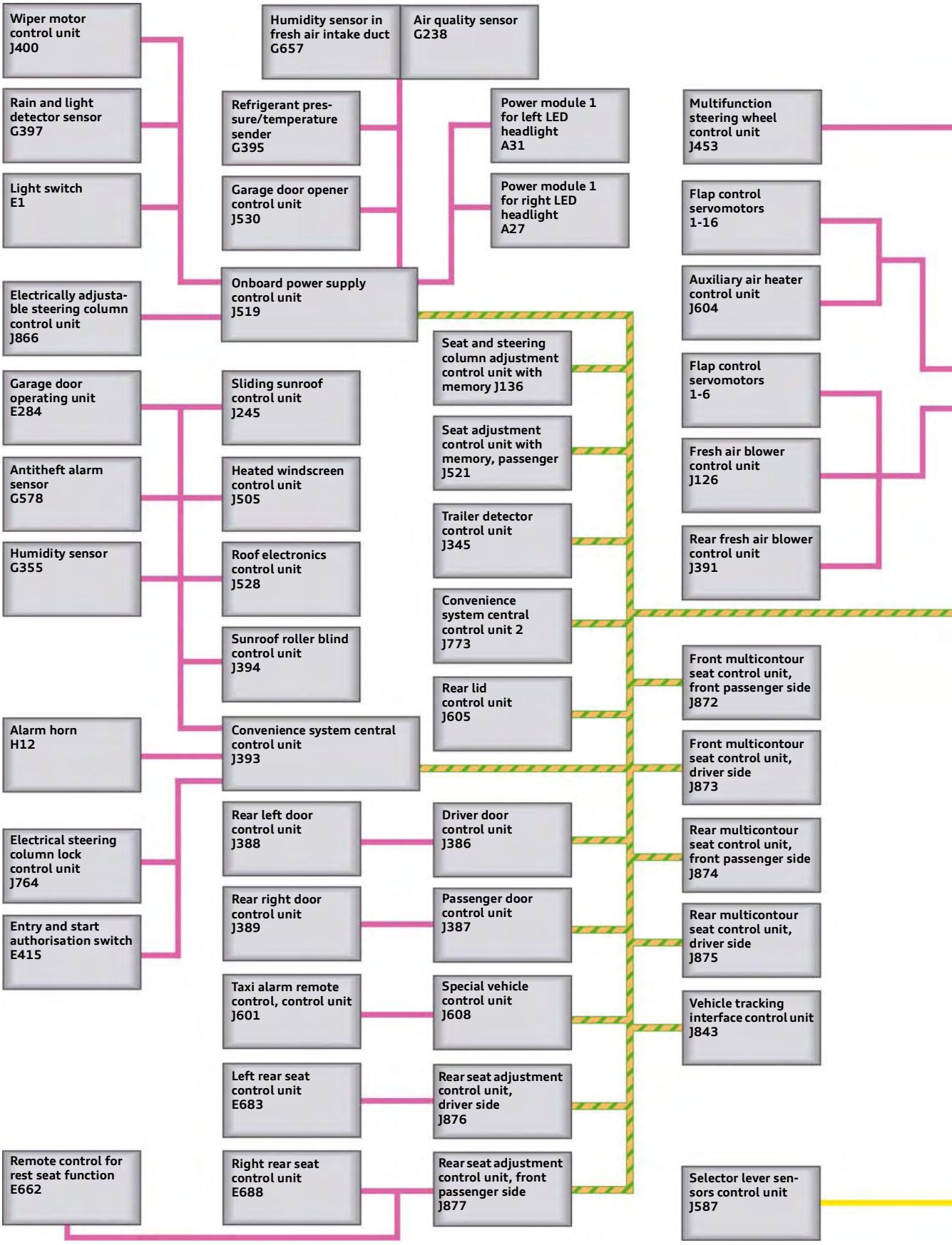
The thermal image enables the driver to recognise not only living beings, but also the road ahead and perimeter of the vehicle.

456_104

If the night vision assist system senses that the vehicle is in danger of colliding with a detected person, a driver warning is issued. The warning is given as an audible signal by the dash panel insert and the yellow pedestrian marking in the camera image is highlighted in red.

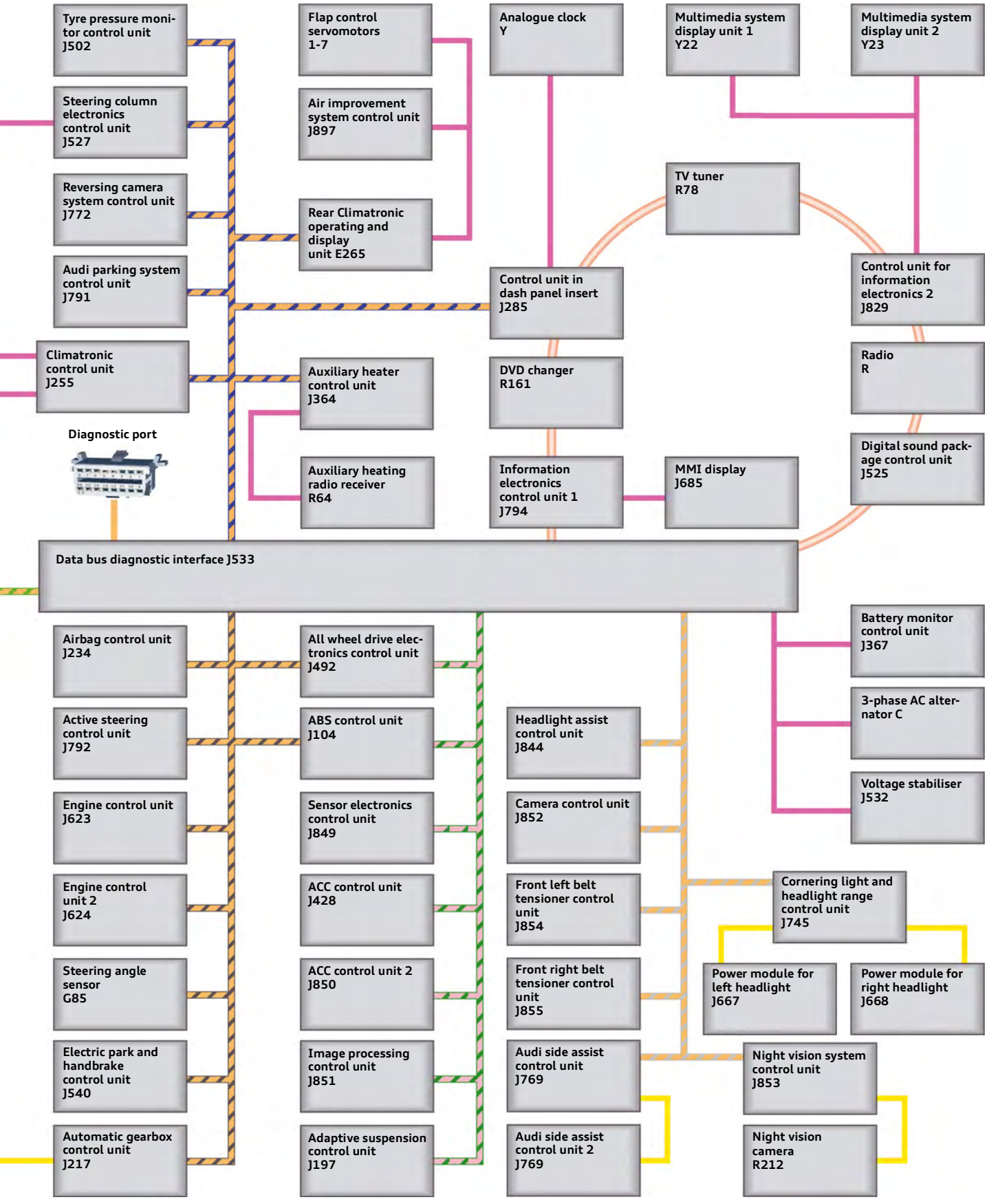
Reference
A separate Self-Study Programme has been published covering the night vision assist system: Self-Study Programme 462. This SSP explains how night vision assist works and how it is operated, as well as describing its displays, system components and diagnostic functions. It also explains special tool VAS 6430/6, which is used for calibrating the camera.

Topology in the Audi A8 ’10



The diagram shows the topology of a model with an extensive trim package.

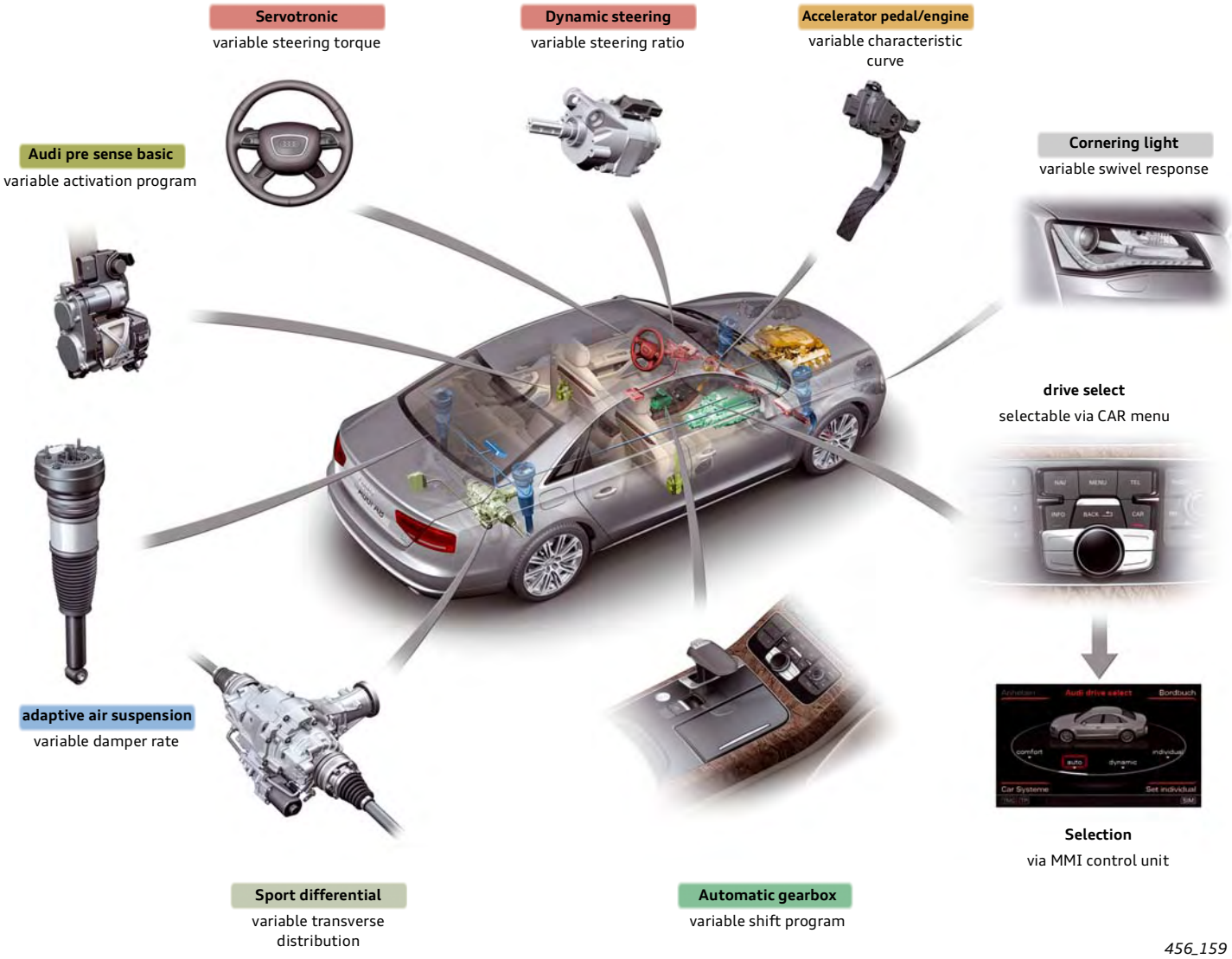
Some of the listed control units are optional equipment or country-specific optional extras.


Tyre pressure monitor control unit J502
Flap control servomotors 1-7
Analogue clock Y
Multimedia system display unit 1 Y22
Multimedia system display unit 2 Y23
Steering column electronics control unit J527
Air improvement system control unit J897
TV tuner R78
Reversing camera system control unit J772
Rear Climatronic operating and display unit E265
Audi parking system control unit J791
Control unit in dash panel insert J285
Control unit for information electronics 2 J829
Climatronic control unit J255
Auxiliary heater control unit J364
DVD changer R161
Radio R
Diagnostic port
Auxiliary heating radio receiver R64
Information electronics control unit 1 J794
MMI display J685
Digital sound package control unit J525
Data bus diagnostic interface J533
Airbag control unit J234
All wheel drive electronics control unit J492
Battery monitor control unit J367
Active steering control unit J792
ABS control unit J104
Headlight assist control unit J844
3-phase AC alternator C
Engine control unit J623
Sensor electronics control unit J849
Camera control unit J852
Voltage stabiliser J532
Engine control unit 2 J624
ACC control unit J428
Front left belt tensioner control unit J854
Cornering light and headlight range control unit J745
Steering angle sensor G85
ACC control unit 2 J850
Front right belt tensioner control unit J855
Power module for left headlight J667
Power module for right headlight J668
Electric park and handbrake control unit J540
Image processing control unit J851
Audi side assist control unit J769
Night vision system control unit J853
Automatic gearbox control unit J217
Adaptive suspension control unit J197
Audi side assist control unit 2 J769
Night vision camera R212
456_117
Powertrain CAN
Convenience CAN
CAN Extended
CAN display and operation
FlexRay
Diagnostics CAN
MOST bus
LIN bus
Sub-bus systems

Audi drive select

The Audi A8 ’10 also comes with the Audi drive select system offered with the Audi A5 for the first time.
Audi drive select allows the driver to select different vehicle set-ups. There are three modes: **comfort**, **auto** and **dynamic**.
This means that the driver can, for example, switch from a sporty driving mode to a comfortable driving mode via the MMI.
In addition to this, in **individual** mode, the driver can configure the vehicle setup to suit his personal preferences.

For instance, a sporty engine setup can be combined with an easy steering action. The vehicle trim package dictates which systems can be controlled by Audi drive select. In all cases, however, the engine, gearbox, steering and adaptive air suspension systems are controlled. The dynamic steering, sport differential, dynamic cornering light and reversible belt tensioner systems can be optionally configured via Audi drive select.



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Operating modes

The operating modes of the Audi drive select system are by no means inflexible driving programs. Each mode is controlled and adapted by the relevant vehicle systems according to driving speed and situation.

comfort
The **comfort** mode provides a more comfort-oriented vehicle setup. The engine, automatic gearbox and sport differential respond to accelerator pedal movements in a balanced way. The steering is light and indirect, and the air suspension and cornering light react in a comfortable way. This setting is suitable for long motorway trips, for example.

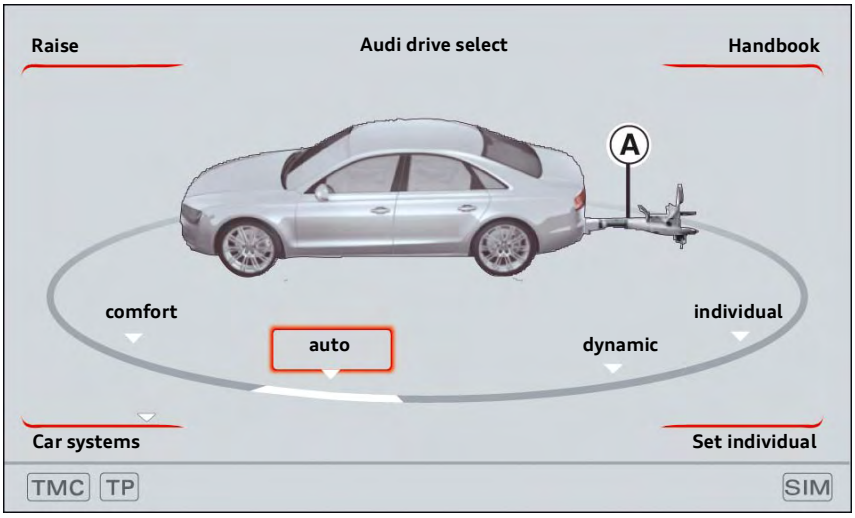
auto
In the whole, the **auto** mode offers a comfortable yet dynamic driving feel. This setup is well suited to everyday use.

dynamic
The **dynamic** mode gives the vehicle a sporty driving feel. The engine responds immediately to accelerator inputs, and the steering is sporty and direct. The sport differential provides extra agility. The air suspension is firmer and the gearbox adjusts its shift points to higher RPM. The cornering light is also designed to allow a sporty driving style. This setup is suited to sporty driving.

individual
In **individual** mode, the driver can select his own setup. These settings are saved and assigned to the remote control key in use.

Unlike the B8 series models (A5, A4 '08 and Q5), which had a separate switch module for setting the Audi drive select program, the Audi A8 '10 is configured at the MMI control unit using the turn/push button.
The operating mode can be selected after pressing the "CAR" function key in the MMI menu.

If a trailer is automatically detected or the customer selects Trailer mode manually, a tow bar is shown on the vehicle in the Audi drive select menu Ⓐ.



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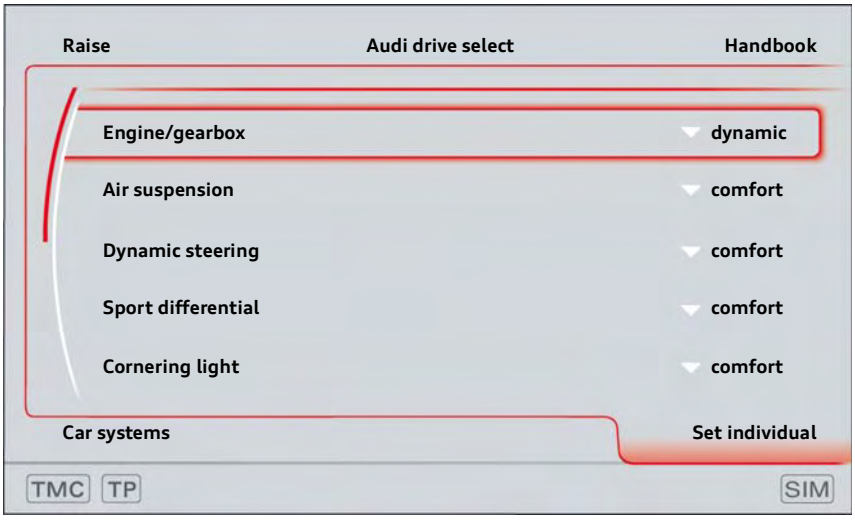
If the driver also presses the "Set individual" control button, the various vehicle systems can be configured individually.



456_161

Characteristics

Depending on driving mode, the **engine and gearbox** react either more responsively or in normal fashion to accelerator inputs.
The **power steering** (servotronic) is adapted to the driving situation and reacts either more lightly or more firmly, depending on what setup has been selected.

adaptive air suspension/adaptive air suspension sport (**Air suspension** at the MMI control unit) is an electronically controlled air suspension and damping system. It is configured according to what driving mode has been selected, and also according to steering inputs, driver braking and acceleration inputs, road surface, vehicle speed and payload. In vehicles with adaptive air suspension sport, the emphasis is generally on a sportier setup. The ground clearance of the vehicle varies according to set mode and speed. If the driver goes faster than about 120 kph for more than 30 seconds in auto or dynamic mode, the ground clearance is automatically adjusted to motorway ride height.
If the vehicle is driven at less than 70 kph for more than 120 seconds, the ground clearance is automatically increased.

In dynamic mode, the activation thresholds of the **reversible belt tensioners** are modified in dependence on the transverse dynamics.

The **dynamic steering system** adjusts the steering ratio in dependence on driving speed in order to minimise steering effort for the driver. At high speeds, for example, a low steering sensitivity is set for better vehicle control. At low speeds, the steering is more direct in order to reduce steering effort, for example when manoeuvring in confined spaces. In addition, the dynamic steering system provides quick steering response at low and medium speeds. The basic characteristic of the steering ratio can be configured by the driver in Audi drive select.

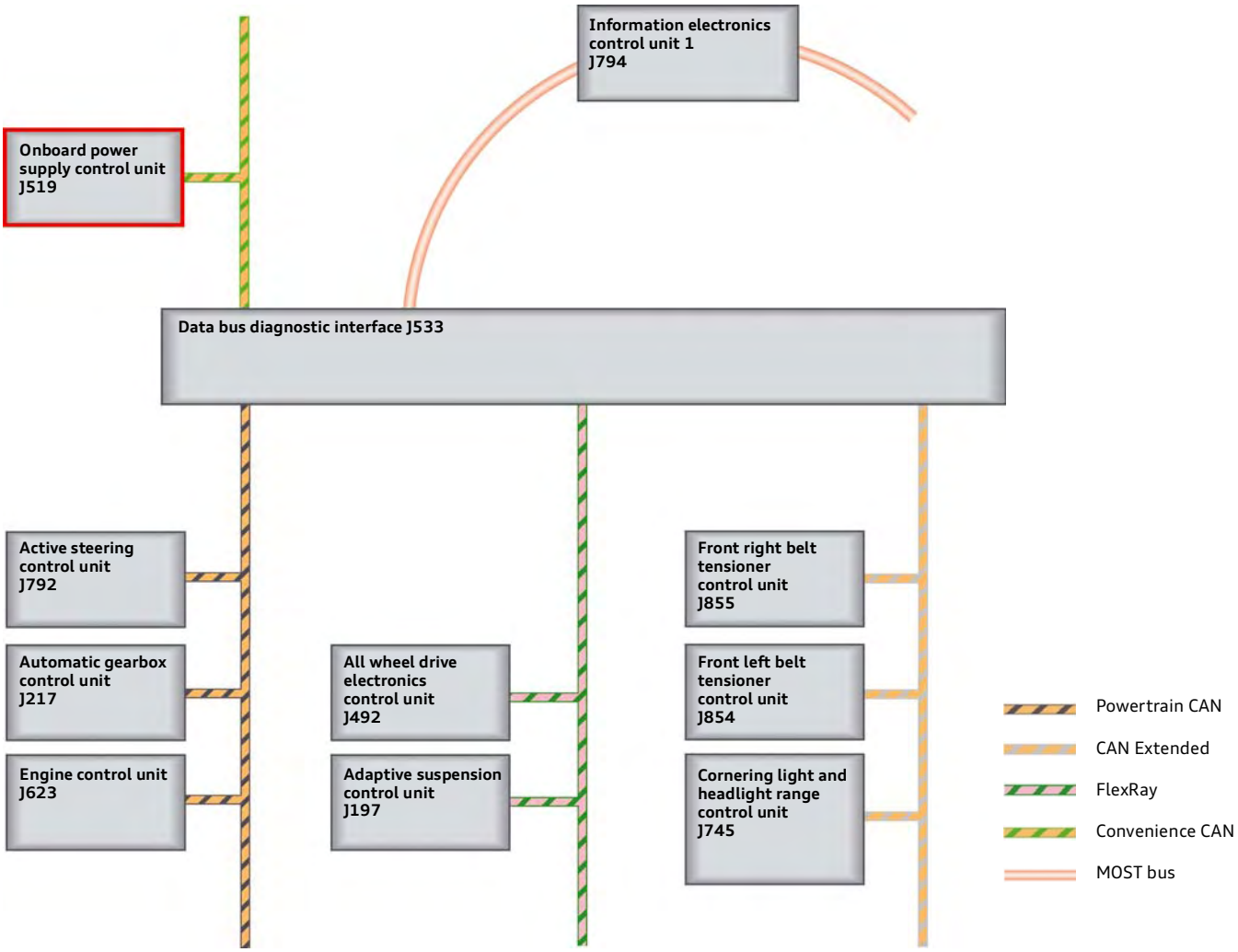
An integral part of the all wheel drive system (quattro®), the **sport differential** distributes tractive power to the rear axle depending on the situation. Power distribution varies according to what mode has been selected.
A high degree of agility and acceleration are achieved when cornering. The vehicle responds very well to steering inputs.
The **cornering light** adapts to the curve geometry at speeds of between 10 kph and 110 kph. Swivel response and illumination are also adapted to driving mode.

The following table summarises the characteristics in each mode.

		comfort	auto	dynamic
	**Engine/gearbox**	normal	normal	sporty
	**Air suspension**[1)]	comfortable	normal	sporty
	**Steering**	comfortable	normal	sporty
	**Dynamic steering**	comfortable and indirect	normal and direct	sporty and direct
	**Sport differential**	normal	responsive	sporty
	**Cornering light**	comfortable	normal	sporty
	**Reversible belt tensioners**	standard	standard	Adapted activation timing

1) The control strategy of the air suspension system is described in SSP 458 "Audi A8 '10 suspension system".

System integration



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Onboard power supply control unit J519 has a central function in the Audi drive select system. Information on driver input is collected by the control unit for information electronics 1 and transferred to the onboard power supply control unit via MOST bus, data bus diagnostic interface (gateway) and convenience CAN bus. The onboard power supply control unit uses this information to generate a suitable activation current for the servotronic valve. At the same time, the corresponding commands are relayed to the gateway across the convenience CAN bus. The gateway distributes these command to the CAN Extended, the powertrain CAN and the FlexRay for the control units integrated in Audi drive select.

As soon as all switching conditions have been met, the user system control unit confirms the changeover by generating an acknowledgement message, which it sends back to the onboard power supply control unit via the gateway.
In this way, the onboard power supply control unit is always informed as to which user system is using which characteristic, and thus can ensure that switching behaviour is logical for the driver.

In B8 series models, Audi drive select was always reset to **auto** mode after the ignition key was removed. In the Audi A8 '10, the mode selected by the driver is preserved even after the removal of the ignition key. Only the engine and gearbox systems always start in normal mode (corresponds to selector lever position "D"). The previous mode setting and the individual mode settings are saved automatically and assigned to the ignition key.

- A sporty shift characteristic is set by selecting **dynamic** mode. Gearbox position "S" is automatically selected.
- In vehicles with dynamic steering, some operating noise can be heard when you start and turn off the engine. This is nothing to be concerned about.
- In vehicles with a sport differential, **dynamic** mode is disabled during trailer operation.
- Some models only reach their top speed in the **auto** and **dynamic** driving modes.

For further information about the operation of Audi drive select, refer to the Owner's Manual.

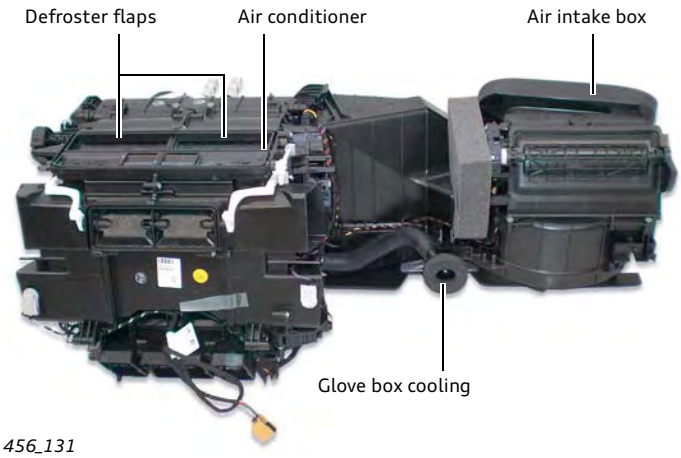
Heating and air conditioning

Air conditioning system in the Audi A8 ’10

The objective for the air conditioning system in the Audi A8 ’10 is to create a pleasant interior climate for all occupants whatever the situation. To save fuel and reduce exhaust and CO_2 emissions, the vehicle's climate control system also has to be as energy-efficient as possible.
The Audi A8 ’10 has an air-side controlled air conditioning system with the same basic configuration as the systems in the Audi A5, A4 and Q5 models.
The refrigerant circuit in the Audi A8 ’10 is controlled by means of an expansion valve. The optional four-zone deluxe automatic air conditioning system uses two expansion valves.

In the case of the rear cabin air conditioning, even the basic version has a twin-flow fresh air blower in the air distributor housing in the centre console. The air distributor housing draws in the air preconditioned by the front air conditioner unit through ducts in the centre console and directs the air flow to the rear passengers. This provides a much better distribution of air throughout the vehicle interior.

Basic dual-zone deluxe automatic air conditioning system: front air conditioner unit and air distributor housing for the rear cabin



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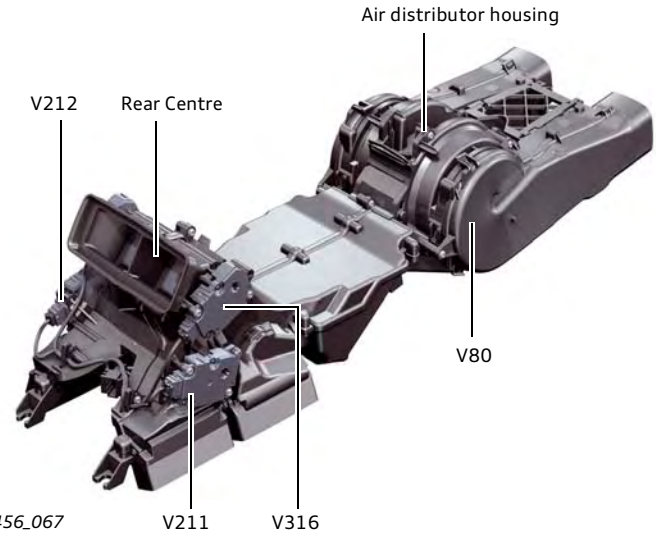

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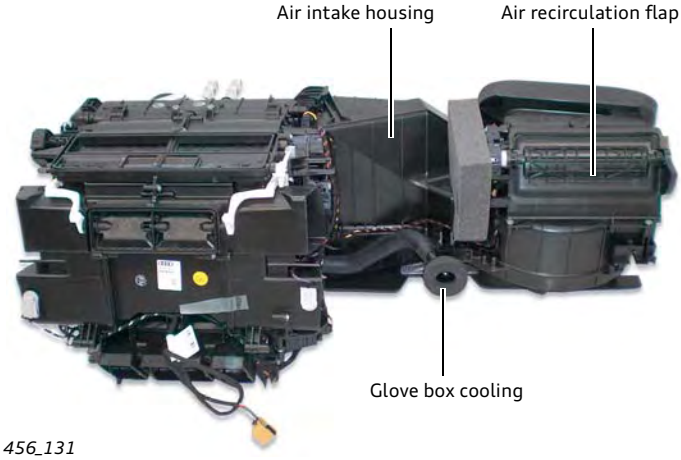
The optional four-zone deluxe automatic air conditioning system also has a separate air conditioning control unit E265 for the rear cabin, which is either integrated in the folding centre armrest or in the extended centre console (in the long-wheelbase version only). With this second control unit, the rear-seat occupants on the driver and front passenger sides can configure the rear climate to suit their individual preferences. They therefore have the same adjustment options as the driver and front passenger.
This genuine four-zone climate control function is provided by the second air conditioner in the centre console, which can both control air temperature and distribute air individually.

Basic dual-zone deluxe automatic air conditioning system: front and rear air conditioners



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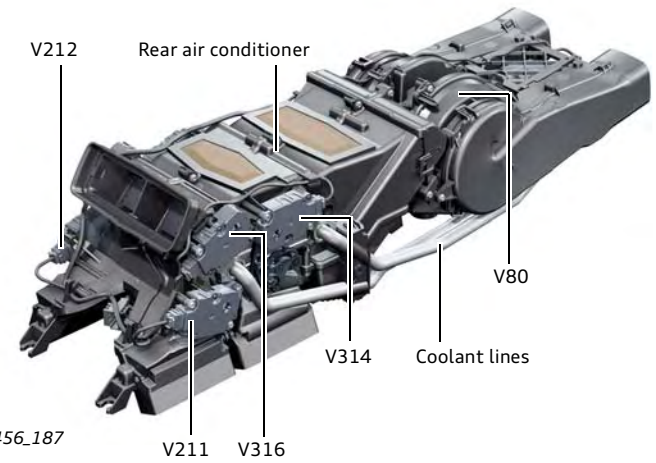


456_187

V211/V212 Left/right B-post/footwell shutoff flap servomotors

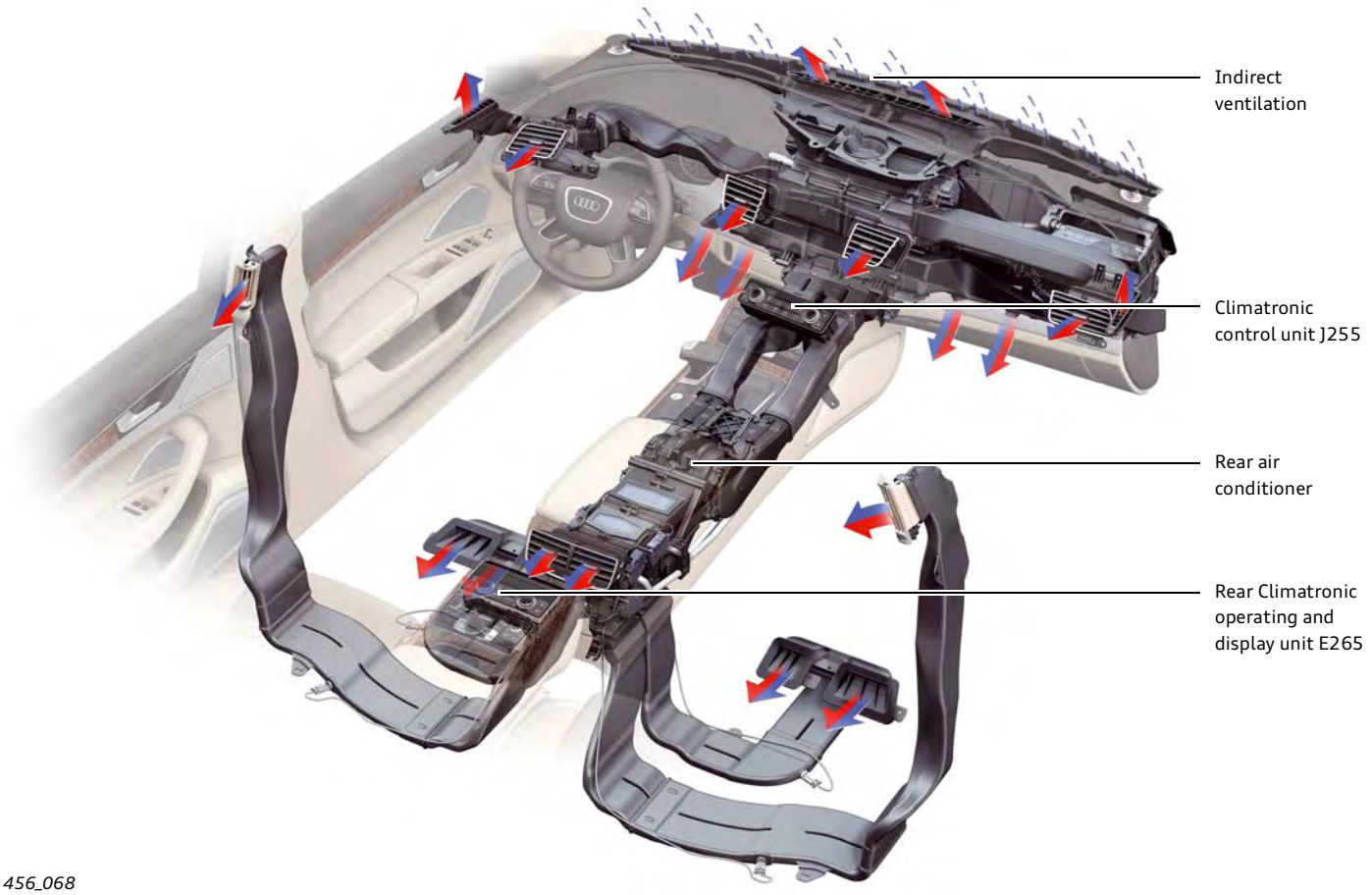
In addition to automatic control of the individual climate zones, the customer has a number of other options for adjusting the air conditioning to his personal preferences.
Three different AC modes can be selected in the AC menu of the MMI:

- intensive
- medium
- soft

When the "soft" setting is selected, the air conditioning subtly blends into the background and creates the desired climate in a manner barely noticeable to the occupants. Air flow is reduced and the air outlet temperatures are adjusted to a moderate level. A diffuse air flow is created by adjusting the positions of the flaps in the air conditioner.

If the "intensive" AC mode is selected, air flow to the cabin is noticeably increased and air is distributed more directly to the body. The temperature level is selected to emphasise the air conditioning characteristic, i.e. in winter it is slightly warmer than in normal mode and in summer slightly cooler.
Footwell temperature can also be adapted at the MMI. This function uses variable temperature stratification to increase or reduce the footwell temperature independently of the other AC settings. This function quickly warms the feet of occupants entering the vehicle in wintery temperatures.

Air distribution in the four-zone deluxe automatic air conditioning system



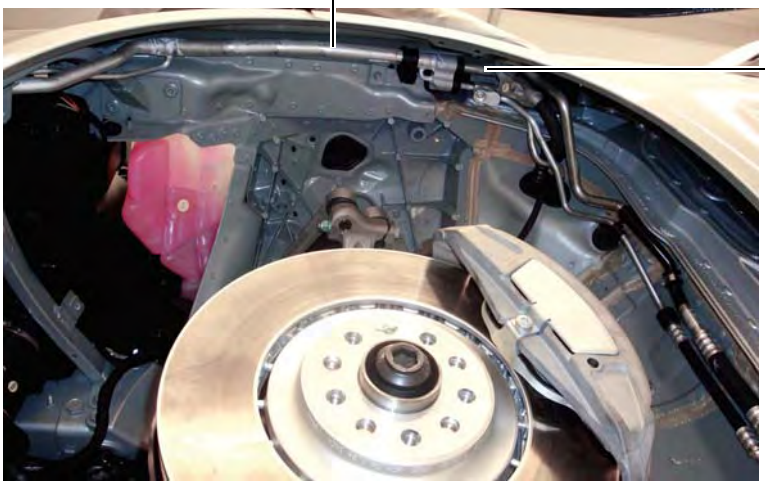
456_068

In Auto mode the new flow control system determines the individual air requirements and the air outlet temperature for each individual outlet of the air circulation system and sets these variables accordingly.
The standard built-in sunlight sensor provides the control unit with information on the intensity and angle of incidence of sunlight impinging on the vehicle. The distribution and conditioning of the air are adapted to provide optimal air flow and temperature at all seats in the vehicle.
The system also recognises manual user inputs (such as the deliberate closing of an air outlet) as control variables and reacts accordingly.

Unlike in conventional vehicles, where air is distributed to the remaining air outlets, the flow control system of the new A8 ’10 maintains a constant air flow at each outlet so that the customer does not feel any unpleasant draught.
To achieve a draught-free and pleasant distribution of air, the new A8 ’10, like its predecessor, uses the tried and tested indirect ventilation system. A diffuse air flow into the vehicle interior is provided through a grille on the top of the dash panel. The low flow rate of the conditioned air avoids the sensation of draught, but ensures that occupants are provided with enough fresh air to the head area.

Like in the Audi A5, A4 and Q5, an internal coaxial counter-flow heat exchanger is used.
The counter-flow principle of the refrigerant circuit means that a certain amount of heat is transferred from the high-pressure side to the low-pressure side.

This reduces the temperature of the refrigerant on the high-pressure side at the evaporator inlet, thereby increasing the efficiency of the refrigerant circuit.



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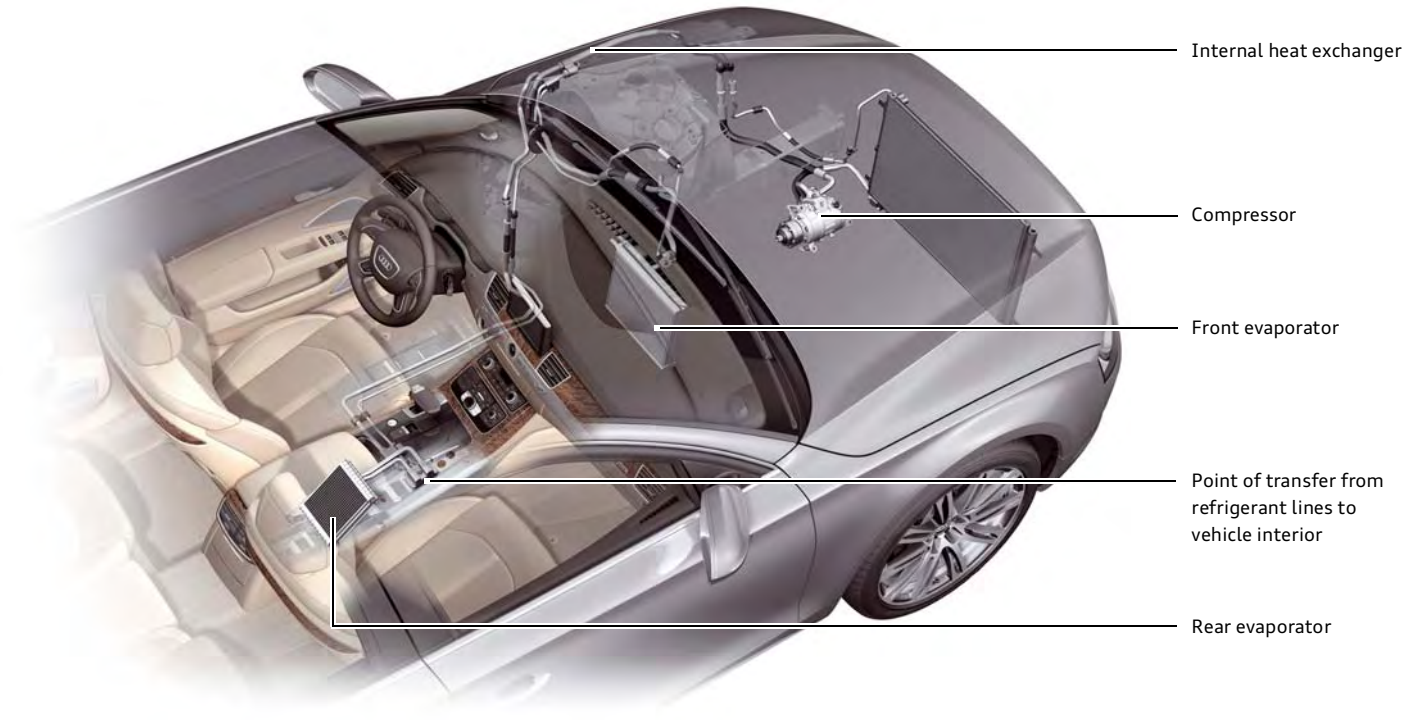


456_069

Internal heat exchanger – installation location on vehicle

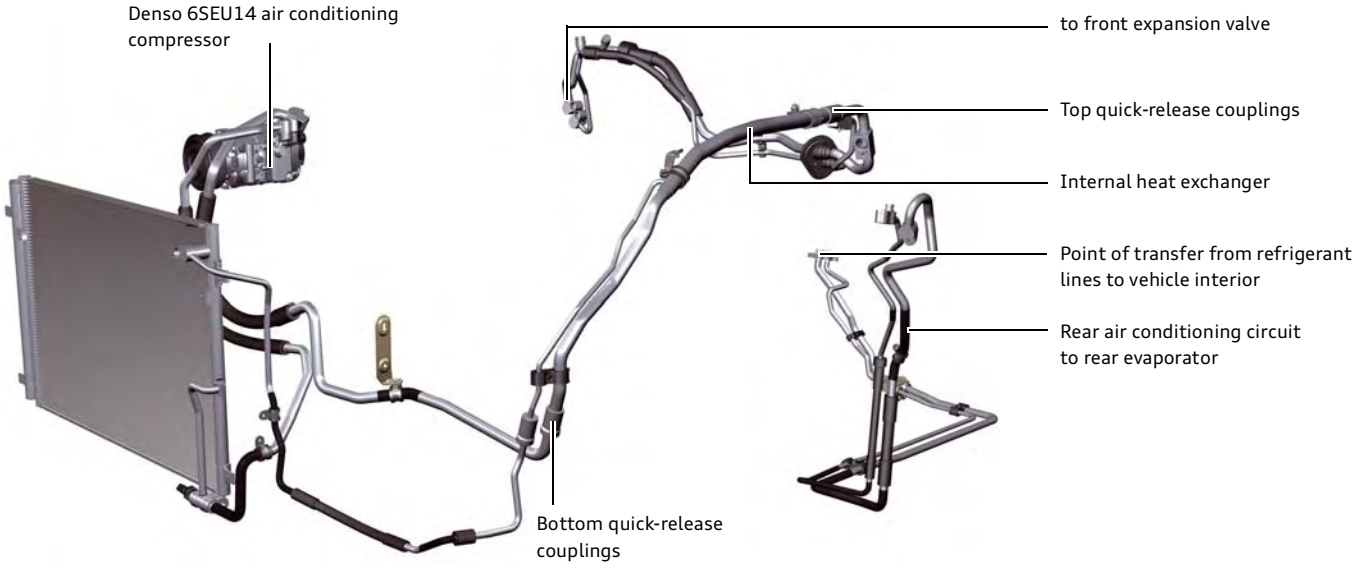
The internal heat exchanger is located in the front left wheel arch. Due to the installation position below the wing stay, the usual release tool T40149 can no longer be used at all connecting points.

A new, modified release tool T40232 can be ordered by service centres for the quick-release couplings at the top of the wheel arch in the Audi A8 ’10.

In the case of the Audi A8 '10, a distinction is made between dual-zone and four-zone air conditioning as regards the refrigerant circuit. In both systems the refrigerant flows through the internal heat exchanger. The four-zone air conditioning system has two evaporators, two expansion valves and two full-fledged air conditioners. Identical air conditioning compressors are used in both systems.

The compressors differ in terms of their installation location in the engine compartment and drive system:

- All compressors are Denso six-piston compressors with a displacement of 140 ccm
- Compressors in the V6 TDI, V8 TDI and W12 engines are driven by a belt pulley
- Compressors in the V8 FSI engine are shaft-driven

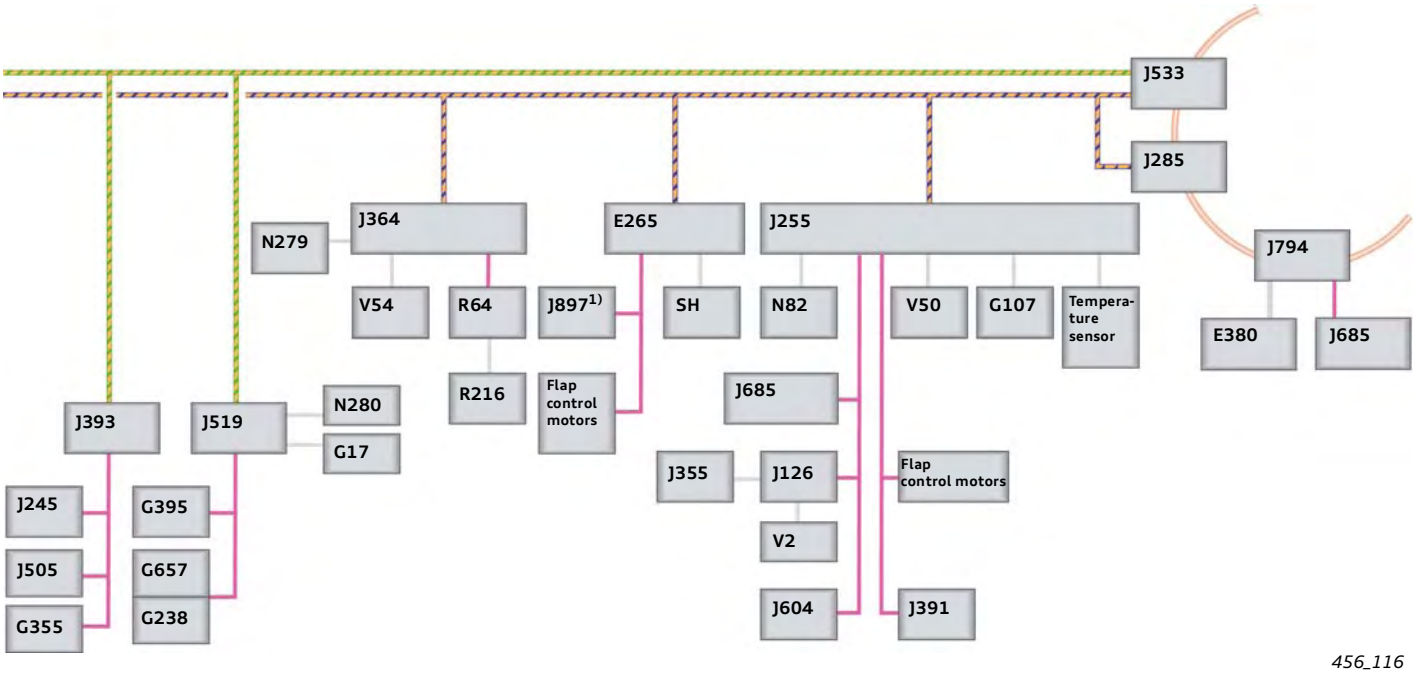


Dual-zone refrigerant circuit configured for a single evaporator

Networking

In the air conditioning system in the Audi A8 '10, the control units communicate via two data bus systems and various LIN bus systems. Like in the A5, A4 and Q5 models, information from various senders is collected by the onboard power supply control unit J519.

The onboard power supply control unit J519 and the convenience system central control unit J393 are coupled to the convenience CAN data bus and communicate with the other bus systems via the data bus diagnostic interface J533, and specifically with the Climatronic control unit J255 which is connected to the display/dash panel insert CAN data bus.

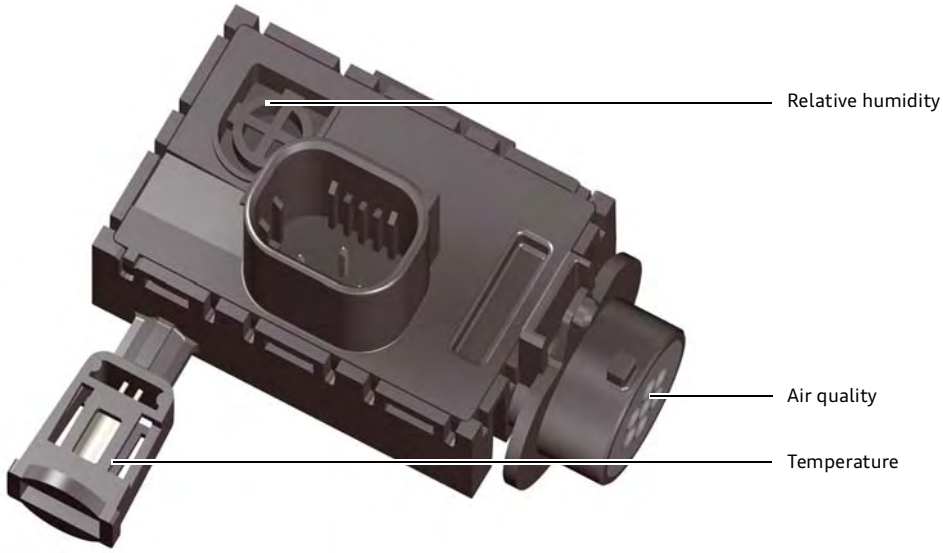


1) J897 for China only

Humidity sender in fresh air intake duct G657

Sender G657 consists of the air quality sensor and the humidity sender. The humidity sender in the fresh air intake duct G657 measures the temperature and moisture content of the bypassing air. The measurement data from G657 is evaluated by the onboard power supply control unit J519 and sent to the Climatronic control unit J255 via data bus.
The Climatronic control unit then computes from the measurement data the current relative humidity of the fresh air entering the vehicle interior.

The computed relative humidity is used to prevent fogging of the vehicle windows from the inside. This is achieved, for instance, by lowering the evaporator temperature or by adapting the characteristic curve for automatic air recirculation. The humidity sender in the fresh air intake duct G657 takes about two minutes to configure itself after ignition on.



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Coolant shutoff valve N82

The coolant shutoff valve N82 is installed in different engine versions in order to separate the heater heat exchanger from the coolant system. This shortens the engine warm-up phase. The coolant shutoff valve N82 is only activated by the Climatronic control unit J255 only various boundary conditions are met.

For example, the Climatronic control unit J255 must be in OFF mode. Vehicles fitted with an auxiliary heater do not have a shutoff valve. Here this task is performed by the heater coolant shutoff valve N279.

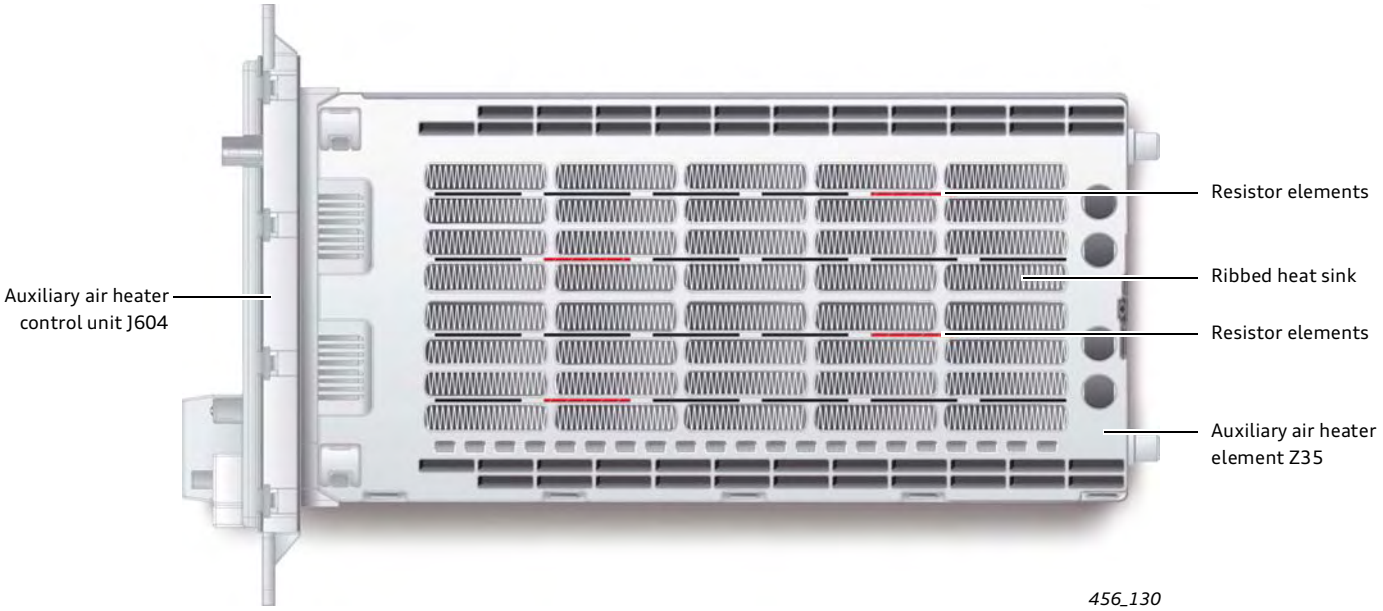
Depending on engine version, the coolant shutoff valve N82 can be located either in the inlet to the heat exchanger or in the return line going from the heat exchanger to the engine.
In vehicles fitted with an auxiliary heater, the heater coolant shutoff valve N279 acts as the coolant shutoff valve N82.

456_129

Auxiliary air heater element Z35

In diesel engines, the auxiliary air heater element Z35 is activated by the auxiliary air heater control unit J604. The electrical current is regulated so as not to overload the onboard power supply. The auxiliary air heater control unit J604 and the auxiliary air heater element Z35 represent a unit. The auxiliary air heater element Z35 consists of multiple resistor elements attached to the conductor bars. The electrical current is diverted to ground through the resistor elements and abutted ribbed heat sinks on the conductor bars.

The ribbed heat sinks are used not only to divert electrical current to the conductor bars but, also to dissipate the electrical energy converted to heat energy by the resistor elements to the air flowing through the heater. The auxiliary air heater element Z35 consists of multiple rows of resistor elements, which collectively have a maximum heating output of approx. 1500 watts.



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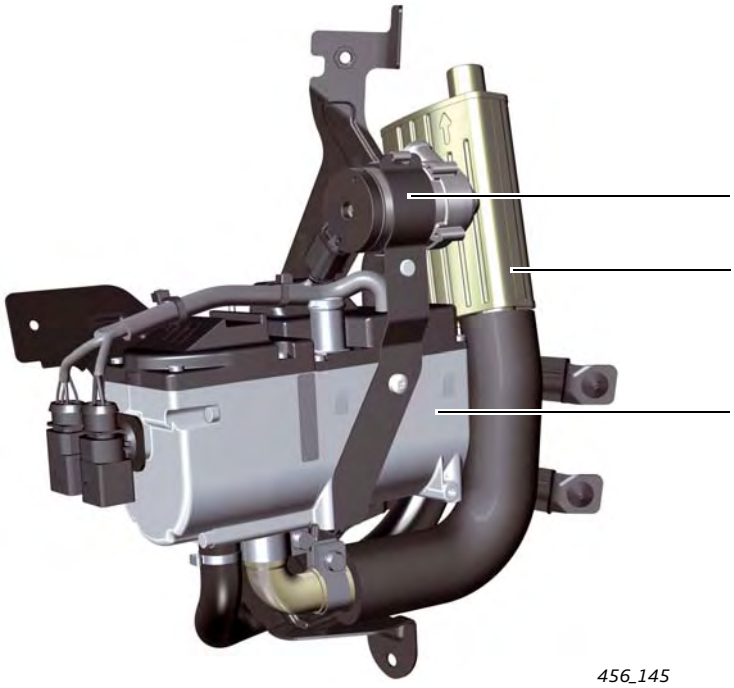
Auxiliary heating

The auxiliary heater is supplied by Eberspächer. An improved Eberspächer Hydronic II heater is used in the Audi A8 ’10. The system is based on the familiar heaters from the Audi A5, A4 and Q5 models and likewise has a fuel preheating heater element Z66 for diesel engines.

The primary task of the auxiliary heater is to heat the vehicle interior.
This task is performed by the heater coolant shutoff valve N279, which controls water circulation towards the heater heat exchanger or engine depending on operating condition.
The auxiliary heater of the Audi A8 ’10 is also used in the A5, A4 and Q5 models.



456_145

The auxiliary heating can be activated either from inside the vehicle (at the MMI control unit) or by remote control.
Two options are available:

- switching on immediately or
- delayed starting by timer programming.

If the system is switched on immediately, the vehicle activates either the auxiliary heater or the auxiliary fan, depending on the ambient temperature and the temperature setting. The timer programming defines when the auxiliary heater begins heating the vehicle interior up to the set temperature.
The selected temperature and ambient temperature dictate when the auxiliary heater or auxiliary fan is switched on.

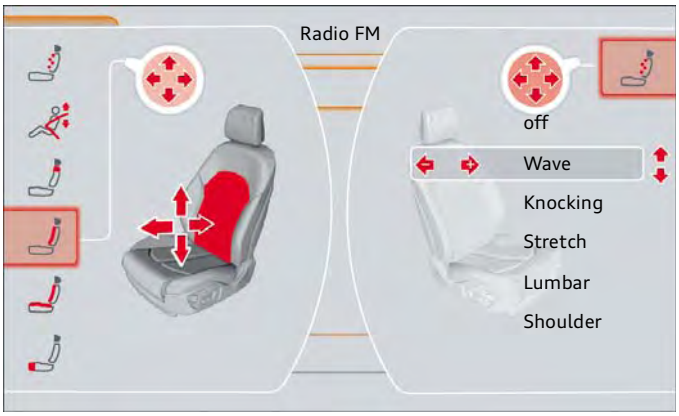
The system has two different heating modes.
In "Defrost" mode the auxiliary heater confines itself to defrosting the windows and providing the driver with an unobstructed view. This keeps energy consumption to a minimum. In Comfort mode, on the other hand, the heating-up time is extended and air distribution inside the vehicle is controlled to provide a pleasant temperature in all seats as soon as the customer enters the vehicle.
The whole system can now be programmed with the new remote control, which clearly presents the extended vehicle communications on its display.

Seat with massage function and ventilation

Various seat variants are used in the Audi A8 '10. The basic seat package includes electrical forward and backward seat adjustments, seat height adjustment, and backrest and seat angle adjustments. The basic seats are optionally available with seat heating and memory function.

The comfort sports seat has pneumatic seat and backrest side cushion adjustments and a lumbar support pneumatically adjustable for height and depth. The upper backrest is electrically adjustable and provides shoulder support.
Seat depth is electrically adjustable for length.

Display of various massage settings for driver and front passenger sides



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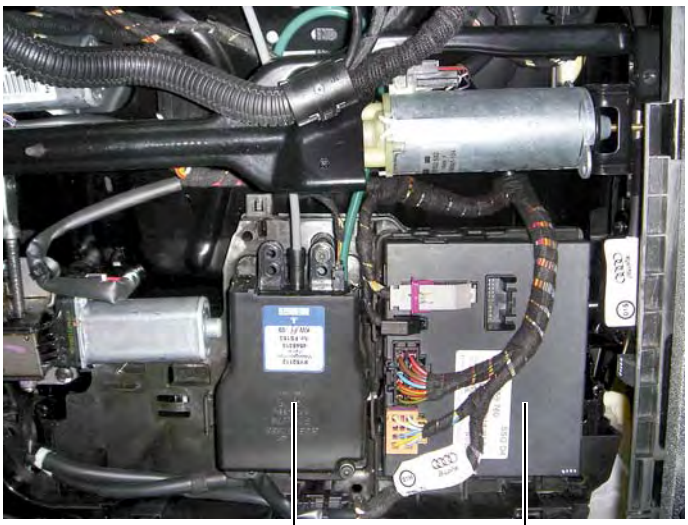
Both the comfort sports seat and the comfort seat are optionally available with seat heating and a climate control or massage function.

The comfort seat is vibration-isolated and has a pneumatic lumbar adjustment andoptional massage functions. The multifunction switch and the display on the MMI control unit can be used to select five different massage programs, as well as for adjusting the massage intensity and activating the pneumatics in the backrest and upper backrest.The comfort head restraints have side adjusting elements for relaxation of the neck muscles.



456_146

Massage pump
Driver compressor
Massage seat, driver's side

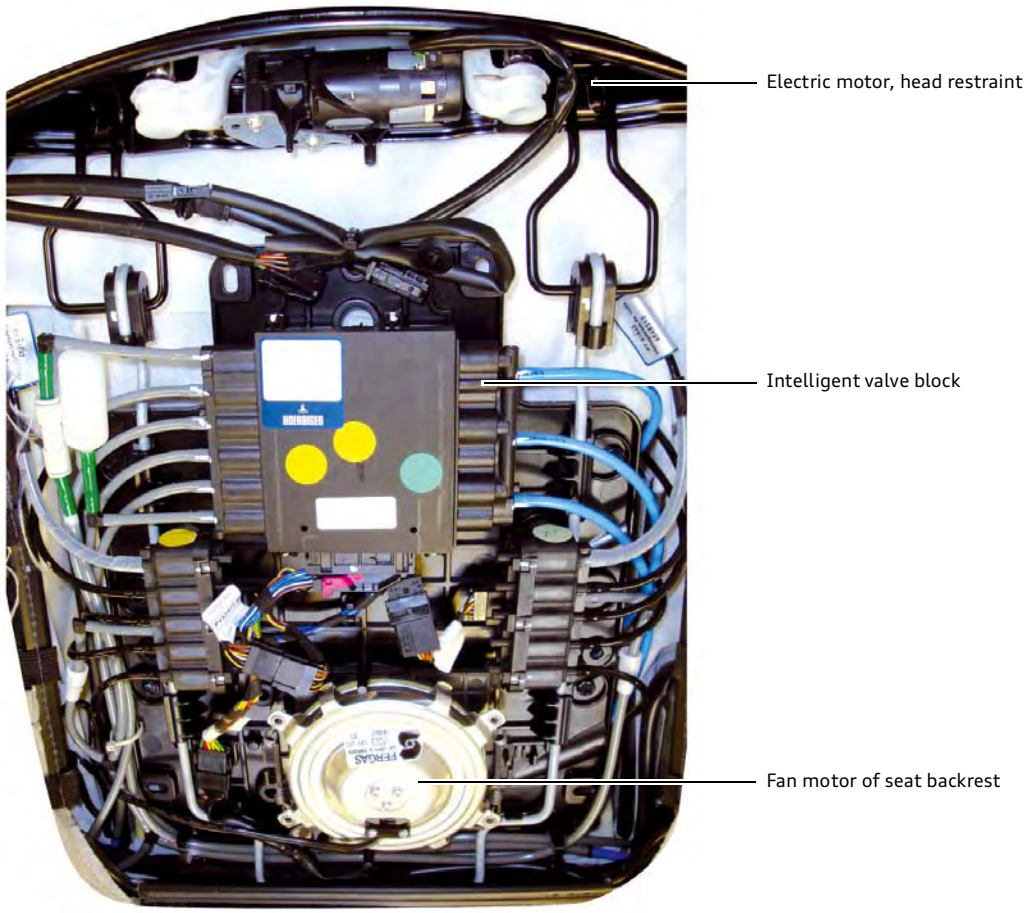
J136

The pneumatics integrated in the seat provide a variety of massage functions which are executed by ten individually switchable chambers in the backrest.
For example, only the shoulder area or the whole back can be massaged. For this purpose, a compressor under the seat supplies the intelligent valve block with compressed air. Depending on which program is selected, air is channelled through the valve block to the air cushions.

All three seat versions have a lumbar adjustment as standard in the front seats. In the basic seat, an electrically operated mechanical lumbar support is used. The comfort seat and the comfort sports seat have a pneumatic lumbar support provided by inflatable cushions in the seat backrest.

The Audi A8 ’10 uses a suction-type seat ventilation system which maintains constant, pleasant seating climate even in hot summer temperatures.
For this purpose, each seat has a climate control function and two fan motors: one fan in the seat and one fan in the backrest.

A breathable fabric in the moulded foam of the seat provides good dispersion of the intake air and creates a pleasant, dry seat climate.
The suction-type climate control system wicks moisture away from the seat surface. This means that air conditioning takes effect on the body very quickly.



456_166

Seat comfort in the rear cabin

The electrically adjustable rear seat is available as a 2+1 seater and has programmable functions such as backrest angle and seat adjustments. In this way, any desired setting is possible between a working position and a relax position.
Seat climate control and pneumatic lumbar support and massage functions are optional. All adjustment functions can be activated from the centre armrest, which can also be folded up into the backrest to create a third middle seat. In the long wheelbase version, the Audi A8 ’10 offers a rest seat with electrically adjustable rear seat, massage and climate control functions.

The massage functions can be activated by means of a remote control stowed in the centre console. Compared to the front seats, the rest seats have individual massage programs adjustable for intensity and speed.
In the rest position maximum legroom is provided by a full forward folding front passenger seat backrest. In the end position a comfortable leg rest folds automatically out of the front backrest. The memory function ensures that the seat reverts to the last adjustment position set by the user.

Infotainment

Audi MMI

The field of information and entertainment electronics has made significant progress in recent years. This is also reflected in the development of in-car infotainment equipment.
In the mid 1990s, in-car infotainment generally consisted of a radio, a CD player and an analogue sound system. Today, multimedia systems with a variety of functions are integrated in high-end models in particular. With the A8 ’10, Audi underscores its claim to leadership in this market segment.

As usual, the new MMI combines cutting-edge technology and intuitive operation with an improved user interface and a host of new functions. Of course, the Audi MMI system remains true to its heritage.
The basic version of the MMI operating system is standard equipment in the Audi A8 ’10. MMI Navigation plus with MMI touch is optional.

456_143

Versions

MMI

Even the MMI, which is fitted as standard in the Audi A8 ’10, impresses with its 8-inch head-up display and the new user interface. It also features a standard sound system with a total output of 180 watts.
Two SD card readers and a 20 GB hard drive for the Jukebox are also integrated in the control unit for information electronics 1 J794.
Other equipment features are listed in the table on the next page.

MMI Navigation plus with MMI touch

MMI Navigation plus is equipped as standard with a touchpad[1)] - the so-called MMI touch. It can be used, among other things, for entering letters and numbers. MMI Navigation plus also includes a Bluetooth interface, which can be used to interface a mobile phone or audio player.
The MMI Navigation plus also uses the Premium speech dialogue system. In addition to navigation and telephone operation, this system can now also be used to control radio and media.
Other equipment features are listed in the table on the next page.

1) A touchpad is a touch-sensitive surface which is used, for example, as a mouse and keypad set

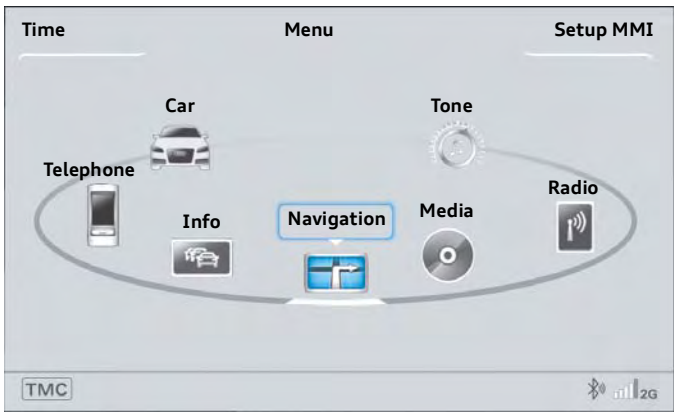
MMI	MMI Navigation plus with MMI touch
 456_088	 456_080
 456_186	 456_149

Standard equipment	
	3D hard drive based navigation system
	Navigation data based vehicle assistance
20 GB hard drive for Jukebox	20 GB hard drive for Jukebox
MMI control unit with 6 station keys	MMI touch control unit
8-inch display with 800x480 pixel resolution	8-inch display with 800x480 pixel resolution
AM/FM radio with phase diversity and background tuner	AM/FM radio with phase diversity and background tuner
New user interface with Car menus: AC display, etc.	New user interface with Car menus: AC display, etc.
Speech control Standard	Speech dialogue system Premium
Standard sound system (6-channel)	Standard sound system (6-channel)
Single DVD drive	Single DVD drive
Two SD card readers	Two SD card readers
	Audi music interface
	Bluetooth interface (9ZX)

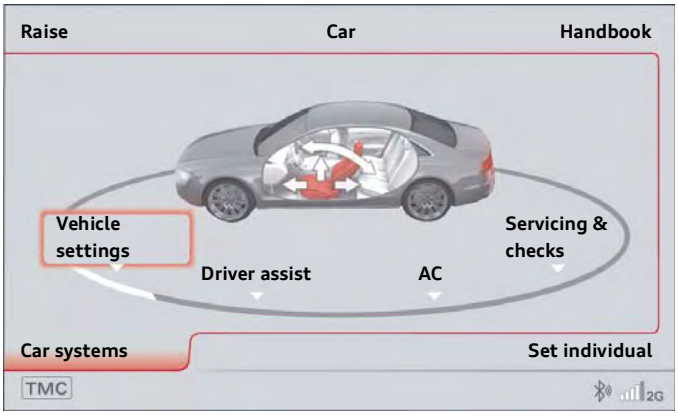
Option	
	Comfort telephony (universal Bluetooth adaptor/ 9ZF)
	Audi Bluetooth car phone (BTA)
	Bluetooth handset for BTA
	Rear Bluetooth handset for BTA
MMI touch (control unit with touchpad)	
DVD changer	DVD changer
Bose Surround Sound (Premium sound system)	Bose Surround Sound (Premium sound system)
Bang & Olufsen Advanced Sound System	Bang & Olufsen Advanced Sound System
Digital radio DAB (Sirius in North America)	Digital radio DAB (Sirius in North America)
TV hybrid tuner	TV hybrid tuner
Rear Seat Entertainment	Rear Seat Entertainment

Operation

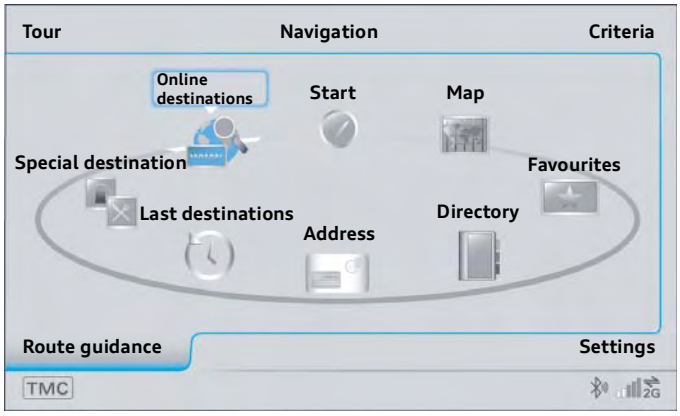
The tried and tested MMI operating concept has been improved for the Audi A8 ’10 to give even more intuitive operation. The display was has also been modified to create more space for menu graphics.
Among other things, the reduced softkey graphics and the new 8-inch display have made this possible. Not least the new language of form and colour have helped to create a new, more user-friendly design. The three-dimensional options menu is straightforward and easy to use.



MMI main menu *456_081*



Car menu *456_082*



Navigation menu *456_093*

The speech dialogue system has been enhanced for greater ease of operation. In the Audi A8 ’10 with MMI Navigation plus, media settings can also be made by speech command. In this way, for example, Jukebox audio files can be selected directly by naming the track.

When selecting audio/video files, the Premium speech dialogue system recognises the languages of German, English, French, Italian and Spanish, regardless of which menu language option has been selected.

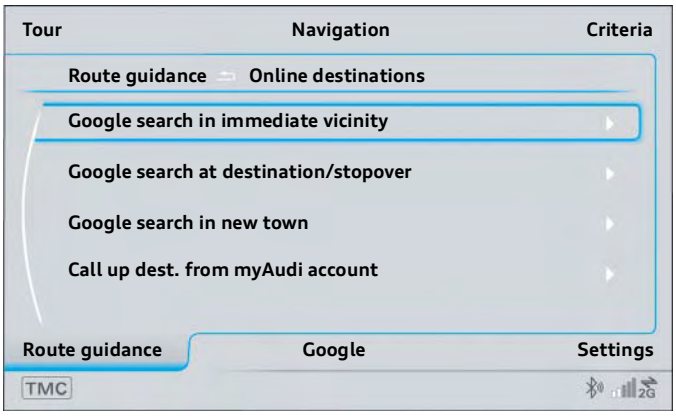
New features of MMI Navigation plus

The navigation system has been further improved for the Audi A8 ’10 and enhanced with several additional functions. These include a number of new features such as the display of speed limits on motorways. Some of the outstanding functions are explained below.

- The new central display with 800x480 pixel resolution in the dash panel insert allows a new, animated route guidance display to be selected as an alternative to the previous directional arrow display. In addition to lane recommendations, the display also shows detailed intersection maps, animated motorway exit displays and useful information on the current route.

Centre display in dash panel insert *456_084*

- The Bluetooth car phone offers another highlight: use of the Google online search machine. It allows fulltext searches via an internet connection to Google. Hits can be displayed together with images and used as a navigation destination.



Google online search menu *456_086*

- With the improved speech dialogue system, it is now also possible to enter a destination by voice entry of the destination, road and house number in direct succession. This function is also known as "one-shot entry".

Control unit for information electronics 1 J794

The control unit for information electronics 1 J794 in the Audi A8 ’10 essentially corresponds to the familiar control unit from the MMI Navigation plus system.
The control unit for information electronics 1 J794 includes the following new features:

- 60 GB hard drive,
  - of which 40 GB are for navigation (with MMI Navigation plus) and
  - 20 GB for Jukebox (with MMI and MMI Navigation plus)
- DVD drive for video file formats (with MMI and MMI Navigation plus)
- Bluetooth interface enhanced for Audi music interface

Control unit for information electronics 1 J794 in the centre console *456_165*

Media playback

In the Audi A8 ’10 audio and video files can be played back in all standard formats. The following drives and interfaces can be used for playback:

- DVD drive
- Jukebox
- Memory card readers
- Audi music interface
- DVD changer

Jukebox

The Jukebox has a capacity of 20 GB. Both audio and video files can be imported. Up to 3000 files can be stored.

In the Audi A8 ’10 tracks can also be imported from an audio CD. The tracks on the audio CD are converted to mp3 format at a rate of 256 kbit/s. In the computer jargon this process is referred to as "ripping".

Album cover display

In the Audi A8 ’10 album covers can be displayed alongside other information in a pop-up window. For this purpose, the album covers must be embedded in an audio file. Maximum size is 800x800 pixels.

Note: the album cover can only be displayed in the album browser if it is embedded in the first file on the album.

Reference
For information on file formats, refer to the operating instructions.

For further information on the third generation MMI, refer to Self-Study Programme 435 "Audi thirdgeneration MMI".

Multimedia system control unit E380

The multimedia system control unit E380 has been completely revamped for the Audi A8 '10 with a special emphasis on even greater ease of use. There are two control units which are distinguished from each other in that one has a six-button number pad for direct selection of preset radio stations and the other a touchpad in place of the number pad. The turn/push control in the version with six-button number pad also has a joystick function.

Control unit with six-button number pad *456_186*

New buttons on the multimedia system control unit are:

- TONE – a separate function button for audio settings
- Six-button number pad; as radio station buttons (standard with MMI)
- Touchpad – among other things, for direct character input (standard with MMI Navigation plus and optional with MMI)
- MENU – skip to main menu (see Fig. 456_081 on page 76)

The following buttons have been deleted:

- SETUP – setups can now be selected directly in any menu (see Fig. 456_093 on page 76)
- NAME – the directory can be accessed directly in the Navigation and Telephone menus (see Fig. 456_093 on page 76)

MMI touch control unit *456_149*

Like the previous solution, the control unit interfaces with the control unit for information electronics 1 J794 via a serial RS232 port. Control unit E380 is diagnosable using the control unit for information electronics 1 J794.

The control unit is responsible for activating the swivel mechanism of the MMI display.

Touchpad

The touchpad is integral to MMI touch. A touch-sensitive control panel is used in place of the six-button number pad. This can perform various functions and is currently used to control the following functions:

- Direct selection of stored radio stations using six displayed station buttons
- Input of letters, numbers and characters by automatic handwriting recognition
- Browse album covers
- Operation of DVD main menu
- Shift navigation map

MMI reset

To reset the MMI, the following buttons must be pressed simultaneously:

- turn/push button
- top right softkey
- TONE

Button combination for MMI reset *456_148*

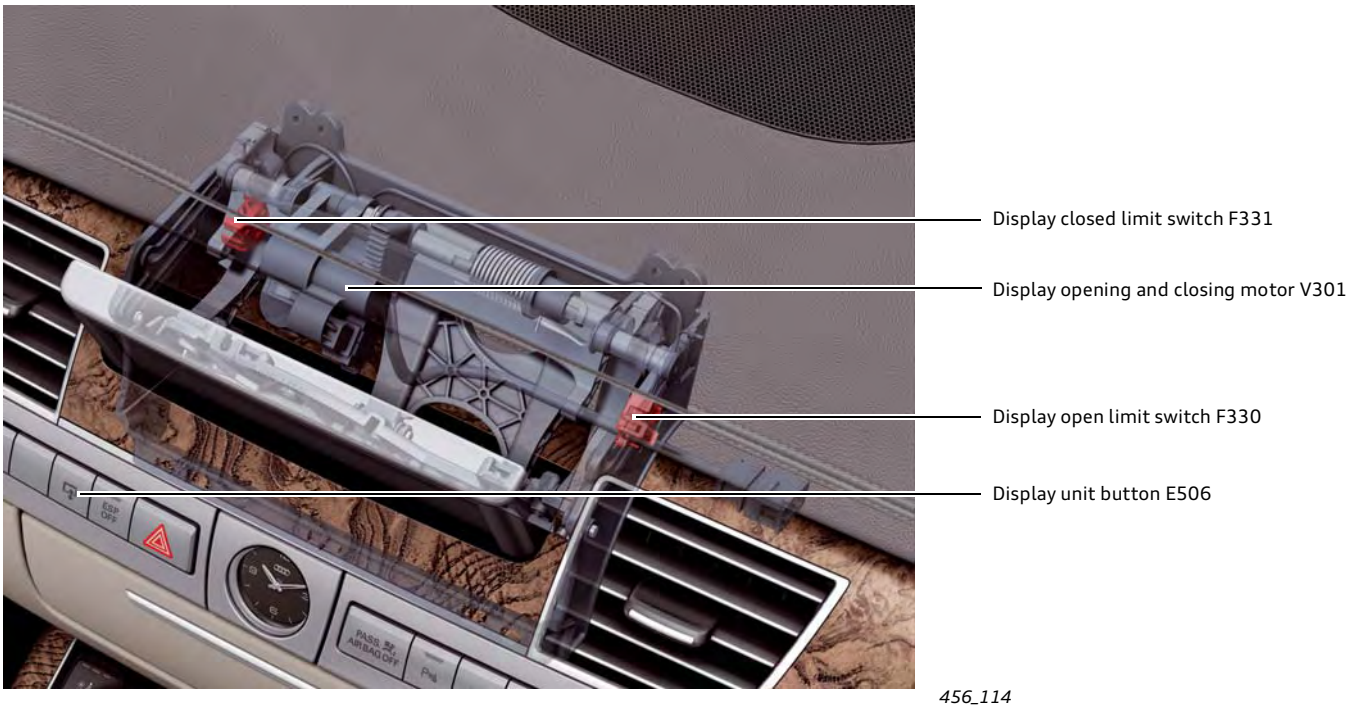
MMI display unit with swivel mechanism

(front information display unit J685)

The Audi A8 ’10 has an 8-inch LCD display based on TFT technology with 800x480 pixel resolution. The display unit is connected to the control unit for information electronics 1 J794 by a 4-pin FAKRA connector. Data is transmitted across a LIN bus line and video signals across two LVDS lines via this connector.

456_143

The MMI display unit is powered by the electrically driven swivel mechanism and pops up automatically.This is done after activating the MMI or pressing the display unit button E506. The swivel mechanism can be activated by the multimedia system control unit E380, which also evaluates both limit switches of the swivel mechanism. One limit switch is responsible for recognition of "display unit popped up" and the other for "display unit retracted".



456_114

Swivel mechanism of the MMI display unit

Protective timeout

If the display unit button E506 is pressed six times within a minute, the one-minute protective timeout is activated. The MMI display remains in its current end position during this time to protect the swivel mechanism against overloading.

Diagnostics

The diagnostic functions of the MMI display unit and the swivel mechanism and the display unit button E506 can be invoked via the control unit for information electronics 1 J794.
The MMI display unit can be diagnosed using address word 5F – Information electronics 1.

DVD changer R161

The Audi A8 ’10 is optionally available with a DVD changer which holds up to six discs and supports audio CD, mp3 CD/DVD and video DVD. The DVD changer is housed in the glove box.

Address word 0E is assigned to the DVD changer R161.
The DVD changer operates in the same way as the known CD changer. The DVD changer has a component protection function which, if active, interrupts playback at one-second intervals depending on medium.

456_155

456_192

DVD changer R161

Reference
For detailed information about supported media and file formats, refer to the operating instructions.

Audi music interface

The Audi music interface (AMI) in the Audi A8 ’10 can not only be used for connecting audio players, but is also a multimedia interface which offers the following connectivity options:

- via cable - iPods or USB mass storage devices, such as mp3 player, USB stick, etc.
- via Bluetooth - audio players

In addition to audio files, videos can be played back through the AMI of the Audi A8 ’10 in the supported file formats or directly from a video player.

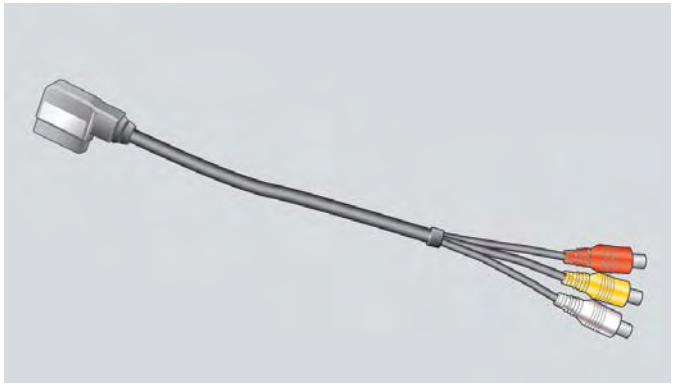
Media menu *456_087*

Connecting by cable

The known adaptors for the third generation MMI can be used for connecting an USB mass storage device or an audio player to the AMI. The Audi music interface in the Audi A8 ’10 can be used to manage USB mass storage media with up to four partitions. For this reason, four virtual USB devices are shown in the Media menu after connecting an USB device.

Media menu for connected USB mass storage device *456_089*

An AV adaptor cable is available for connecting a video source. It can be used to connect video players with 3 RSA outputs.



AV adaptor cable *456_113*

Display of covers

Covers embedded in music files or stored in folders as separate image files are displayed in a pop-up window.

To display a cover stored in a folder as an image file, the image's filename must contain one of the following strings:

- Album
- Cover
- Folder

Note
The Audi music interface is not standard equipment in all countries.

Connecting via Bluetooth

The Bluetooth interface in the control unit for information electronics 1 J794 was previously used only for connecting mobile phones. In the Audi A8 ’10 audio players can also be connected to the Audi music interface via the Bluetooth interface.
To transfer music tracks (audio streaming), the connected audio player must support Bluetooth profile A2DP.

To connect the player for audio streaming, follow these steps:

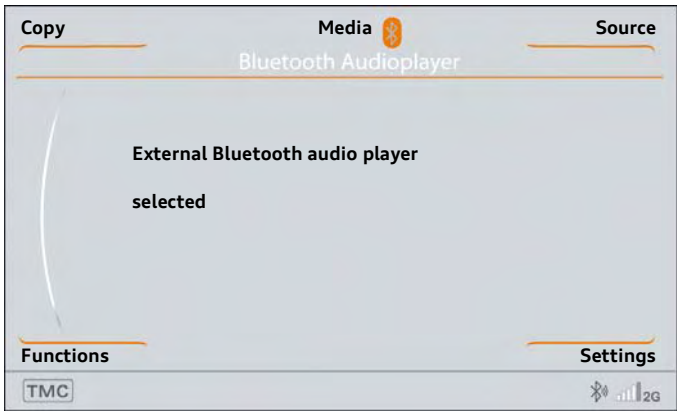
- Activate the Telephone menu
- Press the softkey for "Settings"
- Select the menu option "Bluetooth"
- Select the menu option "Bluetooth audio player on"
- Select the menu option "Find Bluetooth devices"
- Read and acknowledge the information field
- Select the Bluetooth device
- Select the connection mode "Audio player"

If a device has already been connected, it can be reconnected from the "Bonded devices" list.

Parallel connection of two terminal devices with J794 via Bluetooth *456_112*

Mobile phones which support Bluetooth profile A2DP can also be connected via A2DP as audio players. A mobile phone can also be interfaced via Handsfree Profile or SIM Access Profile (if supported).

Once the Bluetooth audio player has been selected under "Media", the information "External Bluetooth audio player selected" is shown on the MMI display.
If the audio player supports track information transfer, this information is displayed instead.



Media menu display for active Bluetooth audio player *456_101*

Operating the Bluetooth audio player

Tracks in the playlist can only be selected on the audio player itself. With most A2DP players, you can skip between the tracks using the arrow buttons on the MMI control unit.

Reference
For more information about approved audio players and control options, refer to the mobile devices database.

Rear Seat Entertainment (RSE)

The Audi A8 ’10 offers the rear-seat occupants entertainment of the highest quality, courtesy of the optional Rear Seat Entertainment system. This system allows the rear-seat occupants to choose their own entertainment programme.
The Rear Seat Entertainment system has the following additional components:

- Control unit for information electronics 2 J829
- Multimedia system control unit 2 E499
- Multimedia system display unit 1 Y22 (rear left display)
- Multimedia system display unit 2 Y23 (rear right display)
- Wireless headphones

Rear Seat Entertainment in the Audi A8 ’10 *456_156*

To ensure maximum accessibility of all media without interfering with driver functions, a zoning concept has been introduced. The vehicle is now subdivided into a front zone, a rear zone and a common zone.

The front zone can only be operated by the front-seat occupants. The following options are integrated here:

- the front internal DVD drive
- the two front SD card readers
- the front Audi music interface
- the front Jukebox

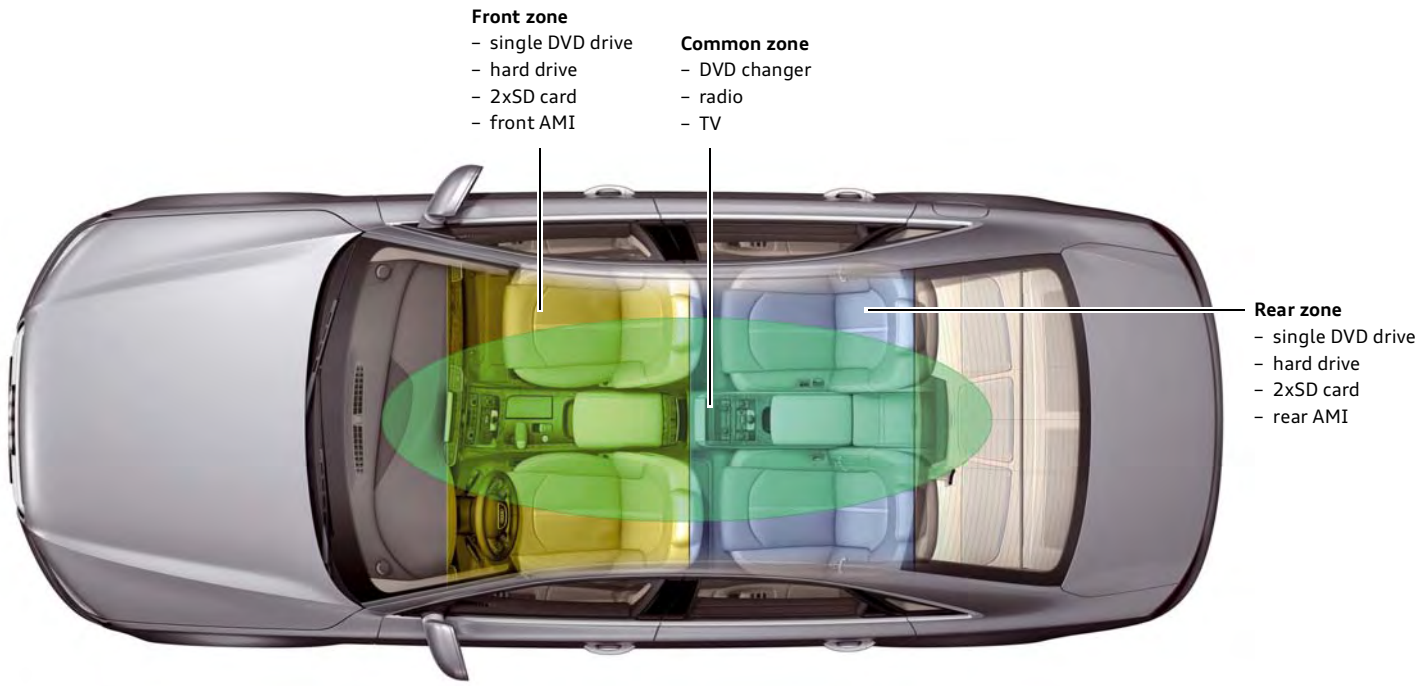
The rear zone, which can only be operated by the rear-seat occupants, has the following options:

- the rear internal DVD drive
- the two rear SD card readers
- the rear Audi music interface
- the rear Jukebox

The common zone provides all information and entertainment sources that can be used and operated by both the front and rear-seat occupants. These are:

- the radio
- the TV tuner (optional)
- the DVD changer (optional)
- the navigation system
- the telephone (can be operated by the rear-seat occupants using the second optional Bluetooth handset)

To make the common zone as user-friendly as possible, Audi adopted a "last wins" approach. Occupants have equal rights to the use of all sources. If a source is already in use, the new user goes to the interface where the previous user left off. If the new user now changes any part of the view, the view also changes for the previous user. Example: when the new user selects a different TV programme, the previous user also sees the changed screen graphics.



Zoning concept of the Rear Seat Entertainment system in the Audi A8 ’10 *456_180*

Control unit for information electronics 2 J829

In the Audi A8 ’10, the control unit for information electronics 2 J829 is behind the centre armrest in the rear.
Basically, it corresponds to the control unit for information electronics 1 J794. It also has

- a Jukebox with 20 GB capacity
- two SD card readers
- a single DVD drive
- an Audi music interface

Information electronics 2 does not have a telephone control unit.

Multimedia system control unit 2 E499

Multimedia system control unit 2 E499 is connected to the control unit for information electronics 2 J829 via an RS232 serial port. Control unit 2 is designed for operating the menu of both rear displays.
It therefore has the following features on the left and right:

- control buttons for MENU, RADIO and MEDIA
- a volume control which doubles as an ON/OFF button
- two arrow buttons which, for example, can be used for fast forward and reverse in CD mode

The central turn/push button with the four control buttons positioned around it and the BACK button can be used from either side. The common controls are always active for the side where one of the side-specific buttons was last pushed.
To be able to connect plug-in headphones, a 3.5 mm jack is integrated in each multimedia system operating unit 2 E499.

456_181

Rear Seat Entertainment system operating unit

Multimedia system display units Y22 and Y23

Two 10-inch TFT displays are available to the rear-seat occupants. These are mounted on backs of both front seats.
Like the front MMI displays, each display unit is connected to the control unit for information electronics 2 J829 via a FAKRA connector.

456_154

Multimedia system display unit

Diagnostics

The control unit for information electronics 2 J829 has the address word 7F – information electronics 2.

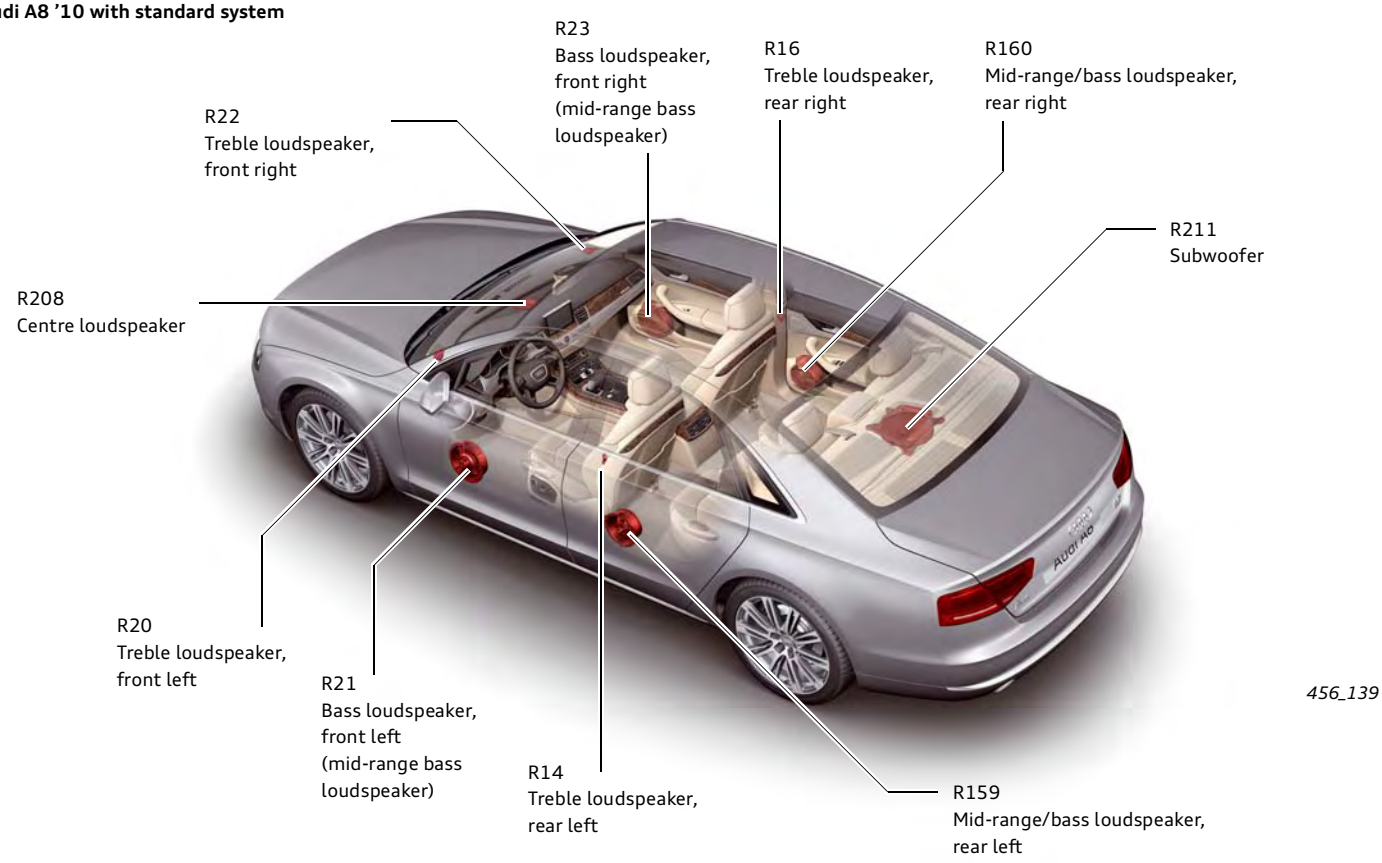
The control unit for information electronics 2 is the diagnostic master for multimedia system operating unit 2 E499 and for multimedia system display units Y22 and Y23. These control units can, therefore, also be diagnosed using address word 7F – information electronics 2.

Sound systems

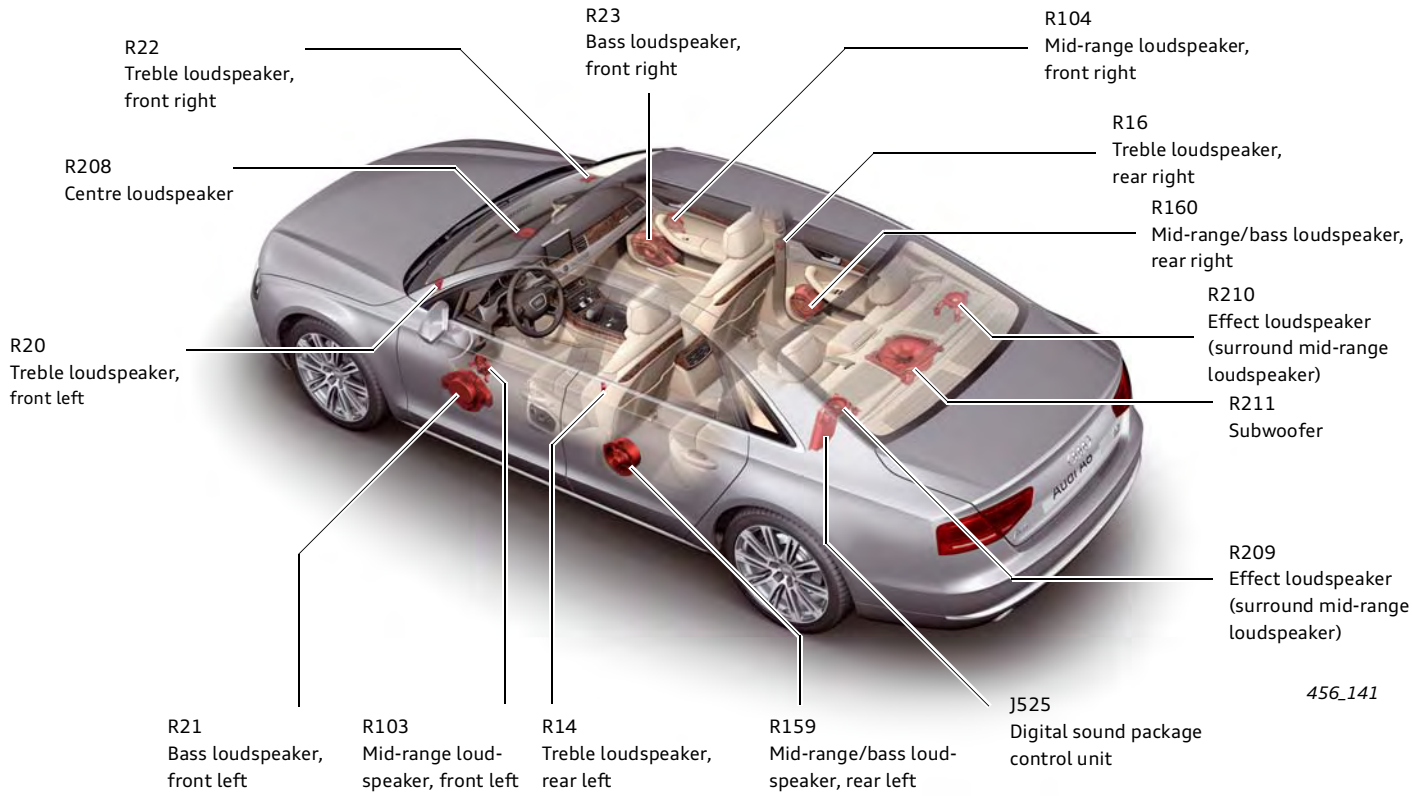
The standard sound system in the Audi A8 ’10 is a six-channel system with 10 loudspeakers and a total output of 180 watts.
For even better sound reproduction, the Premium sound system with separate Bose 12-channel amplifier is optional. The Bose Surround Sound System has 14 loudspeakers and a total output of 630 watts.

The optional Advanced Sound System by Bang & Olufsen offers maximum listening enjoyment. Two amplifiers have been fitted to power the 19 loudspeakers of the Bang & Olufsen Advanced Sound System. These are a 14-channel amplifier and a 5-channel amplifier, which provide a total output of more than 1400 watts. It also stands out visually thanks to its two pop-out tweeters in the dash panel.

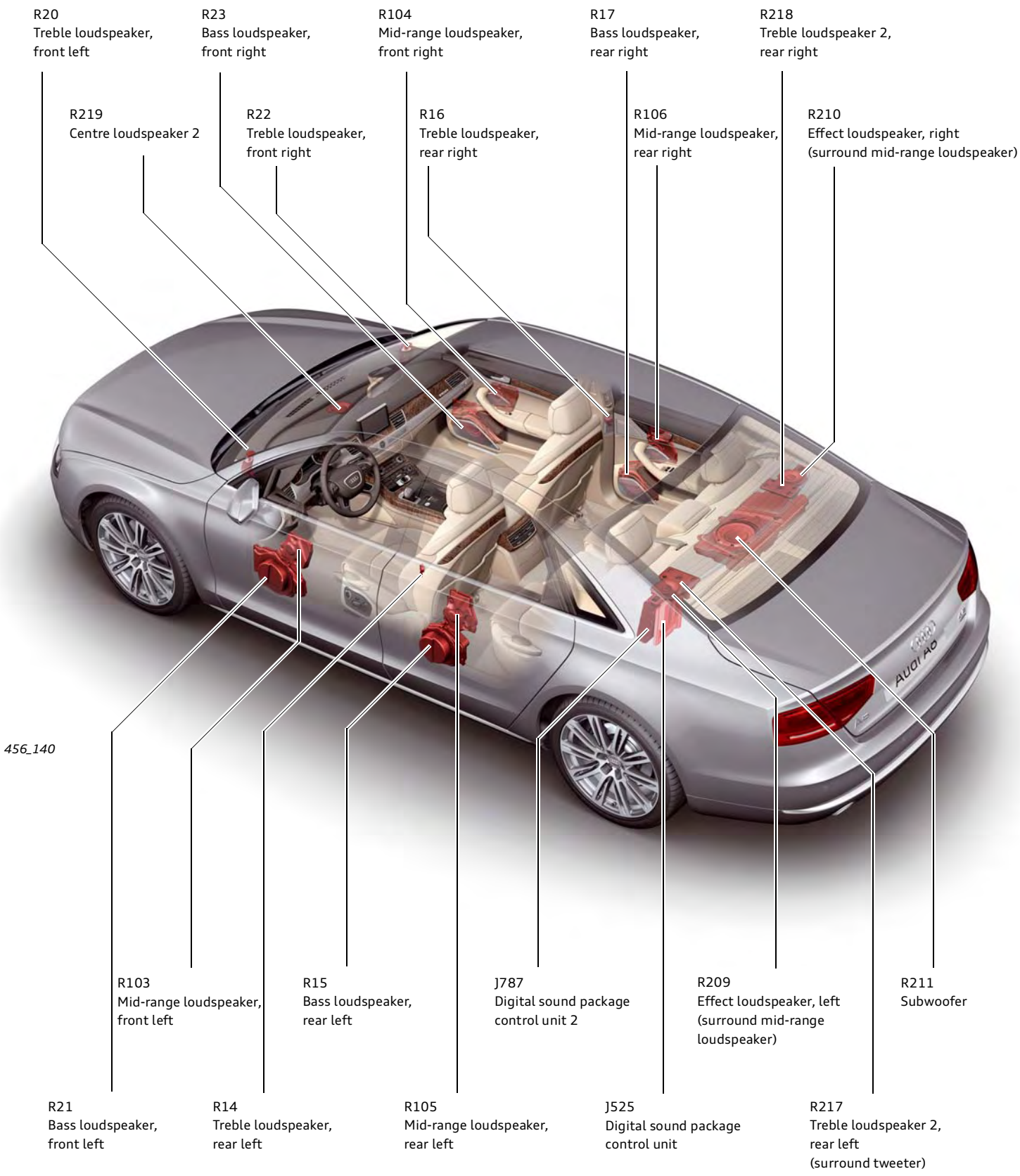
Audi A8 ’10 with standard system



Audi A8 ’10 with Bose Surround Sound



Audi A8 ’10 with Bang & Olufsen Advanced Sound System



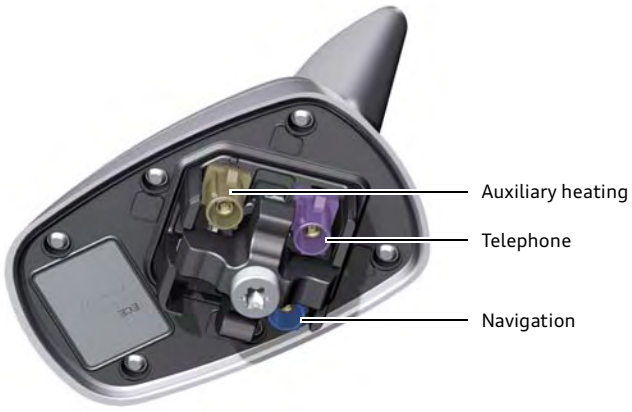
Antenna systems

Most of the antennas in the Audi A8 ’10 are integrated in the rear window. There is an additional exterior antenna on the roof for reception of telephone, navigation and auxiliary heating signals and, in North America, satellite radio (SDARS).

The antenna system is equipped with multiple amplifiers with in-car terminals adapted to the trim package. There are no more terminals than necessary. In the case of amplifiers, a distinction is also made between vehicles with and without tinted glass.

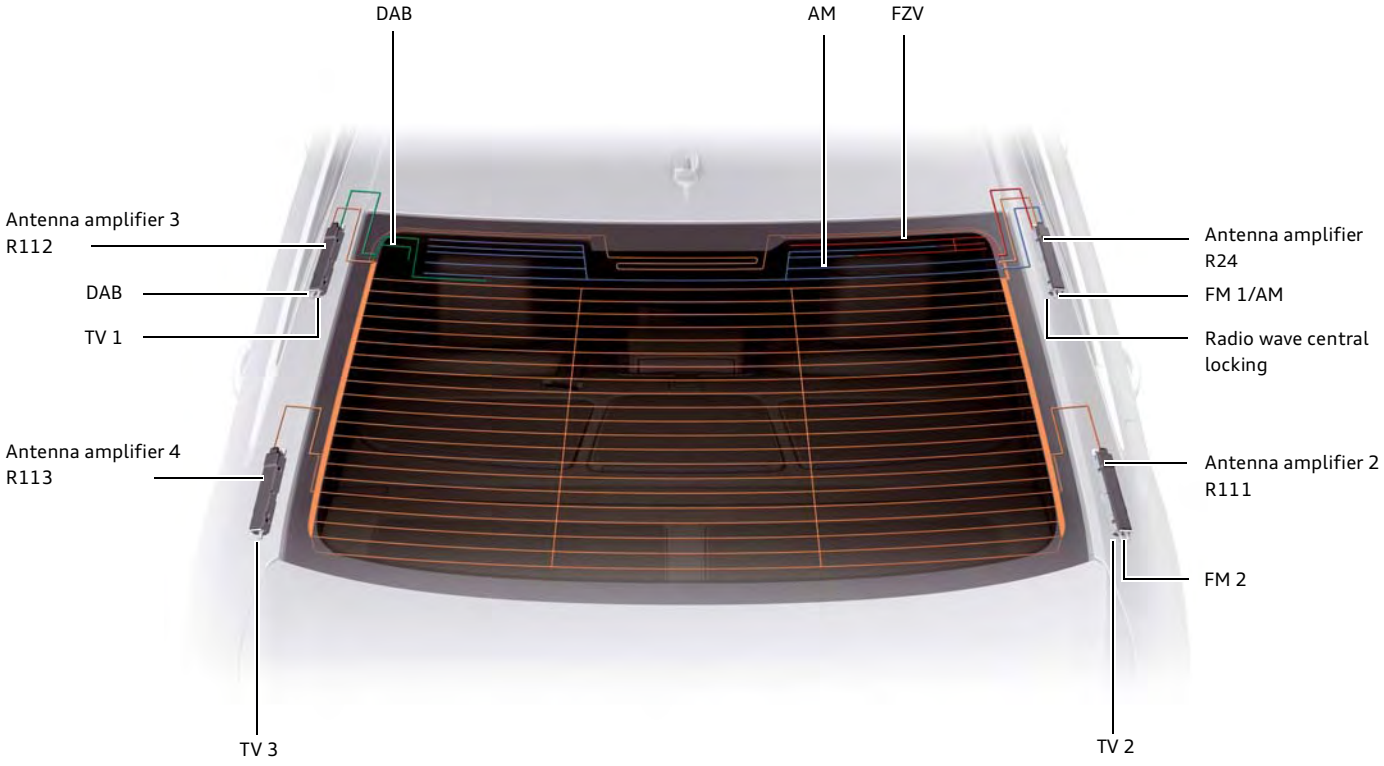
Roof antenna R216
(North America)

Roof antenna R216
(Europe/Rest of World)



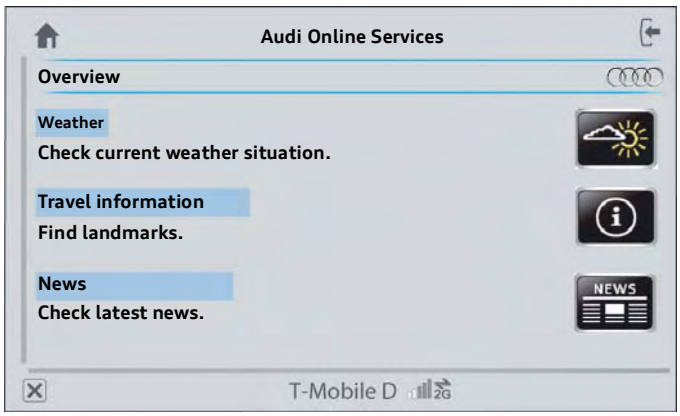
456_151

Summary of antennas in the rear window with amplifiers

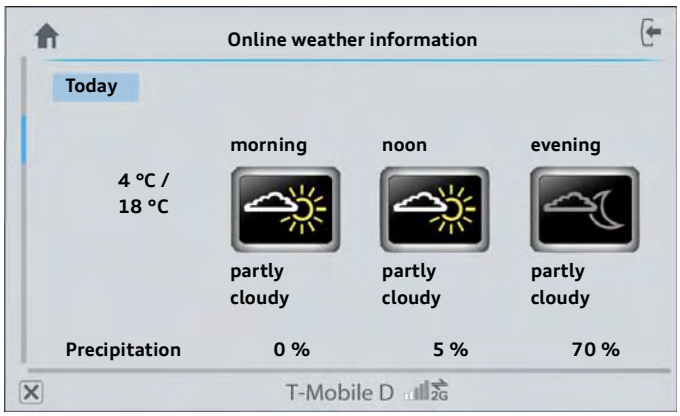


456_150

Audi Online Services (available in Europe only)



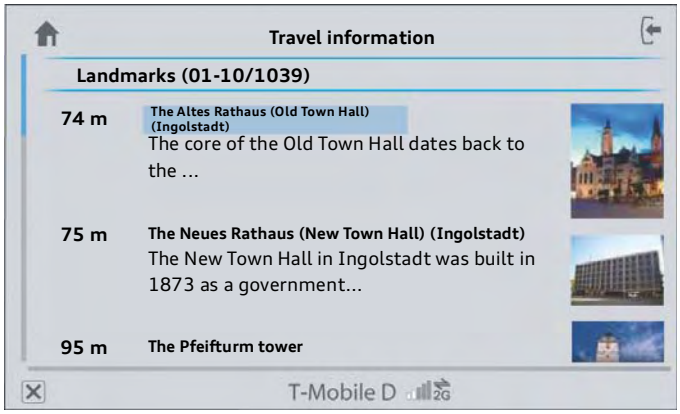
Audi Online Services start menu *456_090*



Display online weather information *456_091*

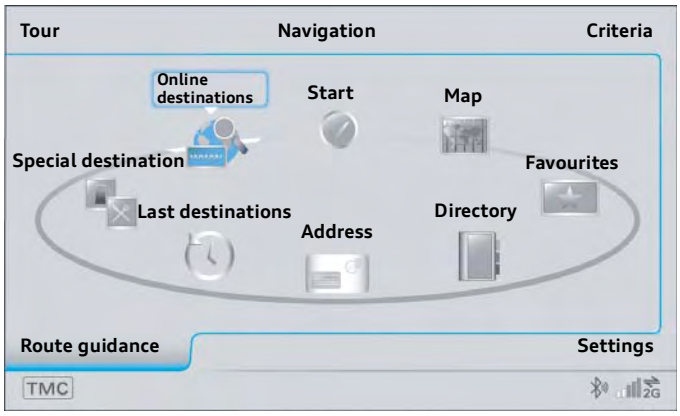
In Europe, the MMI Navigation plus system with MMI touch has a supplementary Audi Online Services function. It enhances the MMI infotainment system by providing current, location-based services from the Internet.

For example, the weather forecast can be displayed for the navigation destination. Of course, it is possible to check the weather for any other location, too. Travel information and news services are also available.



Display travel information *456_092*

Audi Online Services also allows the user to search for special destinations using Google Maps. To access this function in the navigation menu, select "Route guidance" and then activate "Online destinations". This can be used, for example, to search for special destinations such as the nearest ice cream parlour.



Navigation menu with online destinations *456_093*

Prerequisites for the reception of Online Services are:

- a SIM card inserted in the reader

  or

- a mobile phone connected to the SIM Access Profile (SAP)

  and

- the SIM card is enabled for data services

  and

- the data services for this SIM card are configured on board the vehicle

  and

- the Navigation mode has been started.

How can the user obtain the information he wants?

If the user enters a query after pressing first the INFO function button and then the control button for "Online Services", the query is sent to Audi Online.

The query could, for example, be a request for weather information for the current location.

The query then goes to an Audi computer centre. The information is then retrieved from an official online weather service and processed for display on the MMI control unit.

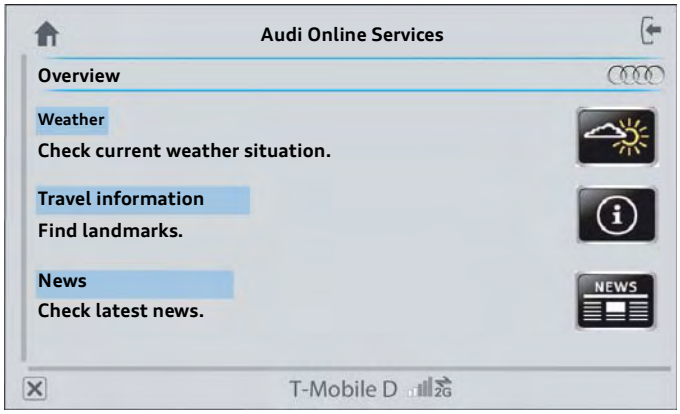
Finally, the requested information is transmitted to the vehicle.

Data is exchanged via the integrated GPRS module (GSM module) of the Bluetooth car phone.

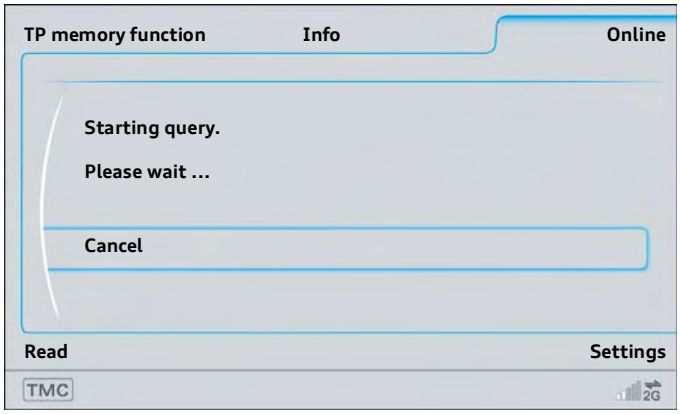
The ⇌ character at the bottom edge of the screen indicates that a data connection is currently active.

The data connection provider charges fees for the use of Audi Online Services.

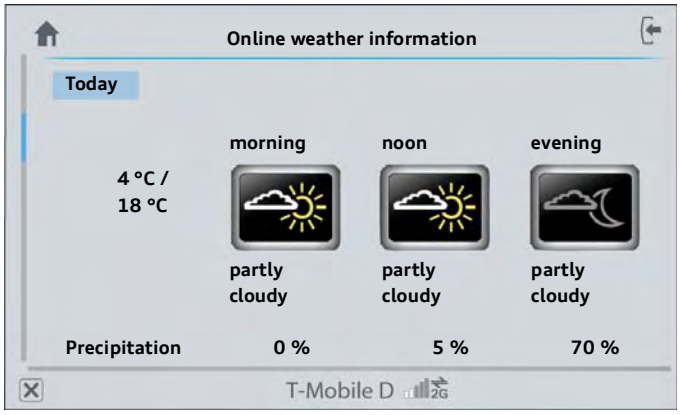
Menu for activating the Online Services *456_072*



Audi Online Services options menu *456_090*



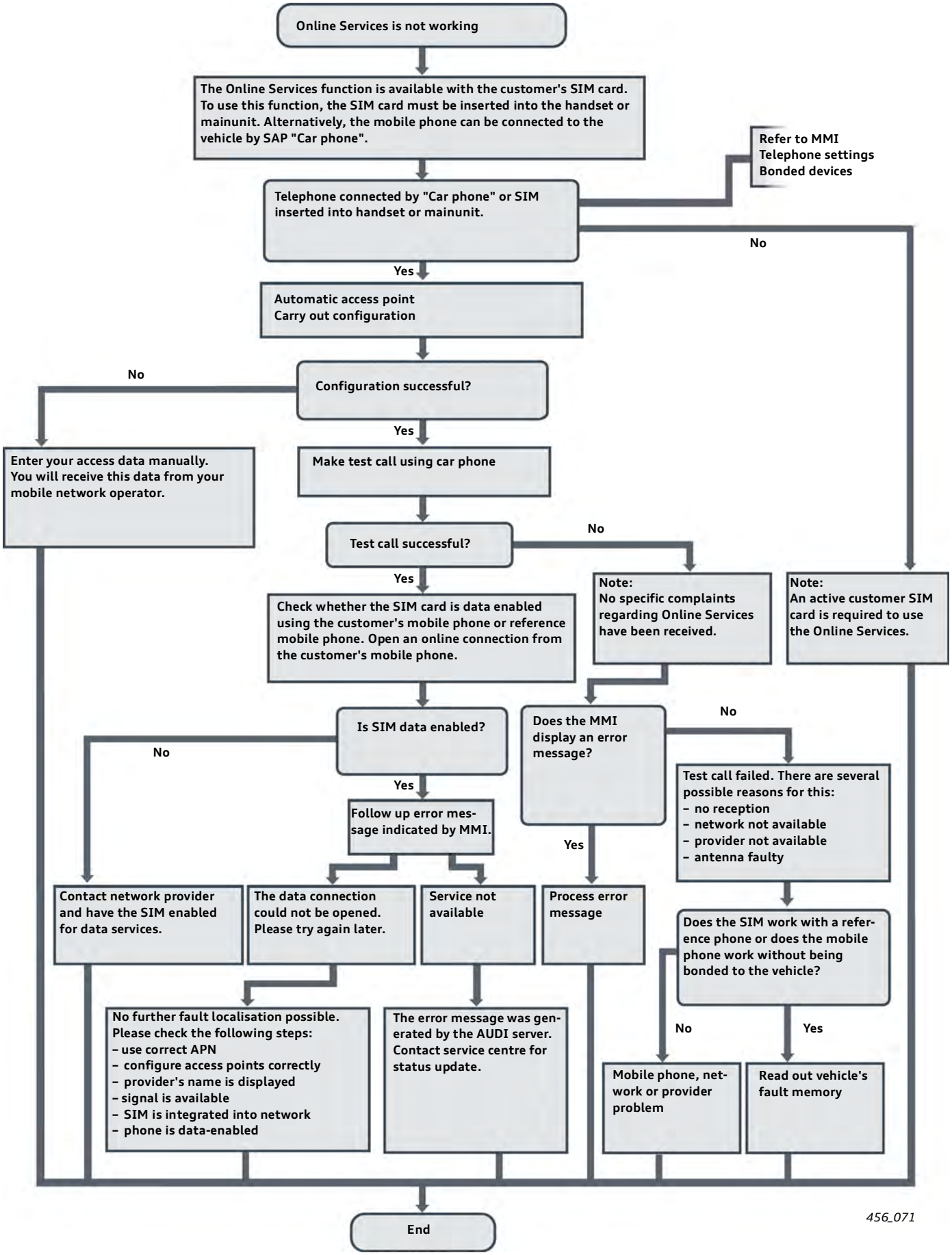
Display during online query *456_095*



Displaying requested weather information *456_091*

Locating and correcting complaints about online services

If complaints are received regarding Audi Online Services, a check must be made before vehicle is collected to determine whether the fault is an automotive fault or a system fault. The following faultfinding tree has been prepared for this purpose:



Reference
The current faultfinding tree from the service literature must be used to locate and correct the problem.

Navigation data based vehicle assistance

A large volume of information is needed for the "anticipatory operation" of driver assistance systems. This information is acquired either by the vehicle's own sensors or obtained from other control units. Special route data from the navigation system can also be used in the Audi A8 ’10.
This so-called predictive route data is transferred to the MOST bus by the information control unit 1 J794.

Route data is transmitted cyclically in the form of data packets.
The total length of the route transmitted depends on the available information density.

The route data contains information such as:

- Road class (motorway, trunk road, etc.)
- Number of lanes
- On-ramps and off-ramps (motorways)
- Curve geometry (radius, curve length, etc.)
- Country code
- Speed limits
- In town or out of town

Which data has to be transferred from the navigation system?

To implement the navigation system in the corresponding control units, it is sufficient to make available a route (including alternative routes) directly ahead of the vehicle. For this reason, the navigation system sends data on the route ahead of the vehicle.
The navigation system sends this predictive route data even if the route guidance function is disabled.
Due to differences in information density, the length of the described section can vary between 300 m and 3 km.

How is the data structured for content?

The route to be travelled is subdivided into individual segments. Each segment contains section-related information. Once a segment has been covered, another segment is added during the next data transfer.

Which control units in the Audi A8 ’10 use this navigation data?

- Automatic gearbox control unit J217
- Adaptive cruise control (ACC) control unit J428
- Cornering light and headlight range control unit J745

What do the control units use this data for?

The automatic gearbox control unit can, for instance, use the data to avoid unnecessary gearshifts before entering corners or while cornering.

The ACC control unit does not, for instance, accelerate on off-ramps even if no vehicle ahead is detected after crossing into the deceleration lane. In addition, the data can be used to determine the lane in which the vehicle ahead is travelling.

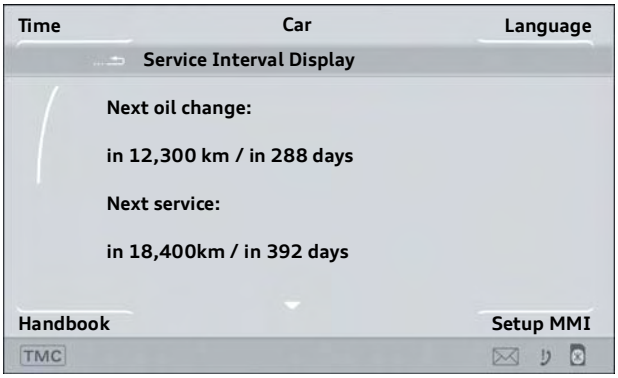
The cornering light and headlight range control unit requires this data, for example, to reconfigure the headlight beam near intersections.

The Advanced Maintenance Concept

The Audi A8 ’10, like many other Audi models, now supports the Advanced Maintenance Concept. This allows for various driving profiles, specific conditions of use, mileage and time-based service events.

The following service work is displayed separately:

- as a flexible service event, the oil change is dependent on the individual driving profile
- mileage-based service events due after a multiple of 30,000 km
- time-based service events due after the expiration of certain defined intervals, e.g. the first brake fluid change is due after three years



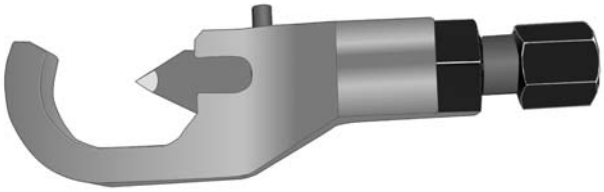
456_127

Summary of maintenance intervals

	Audi A8 4.2l FSI 273 kW	Audi A8 3.0l TFSI 213 kW	Audi A8 4.2l TDI 258 kW	Audi A8 3.0l TDI 185 kW
Engine oil change	flexible, 15,000–30,000 km/2 years			
Service ▸ **Mileage-based service events** ▸ **Time-based service events**	every 30,000 km 3, 5, 7 years, etc.			
Air filter	90,000 km	60,000 km	90,000 km	60,000 km
Spark plugs	90,000 km/6 years	90,000 km/6 years		
Fuel filter	Lifetime	Lifetime	60,000 km	60,000 km
Timing gear chain	Lifetime	Lifetime	Lifetime	Lifetime
Brake fluid	First change is due after 3 years (market dependent), and subsequently after every 2 years			
Ash in diesel particulate filter			Read out after 180,000 km, and subsequently every 30,000 km	

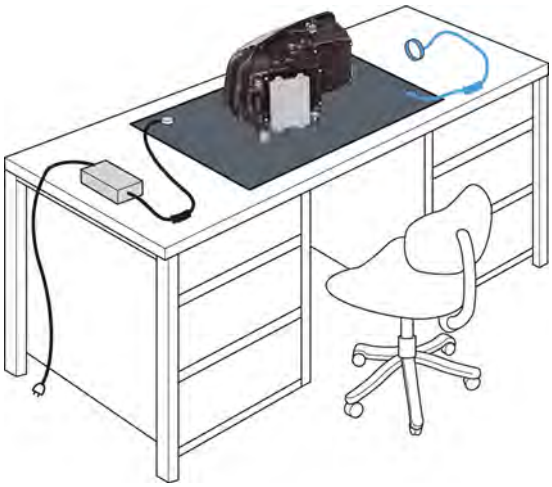
Note
The intervals specified in the current service literature always apply.

Special tools



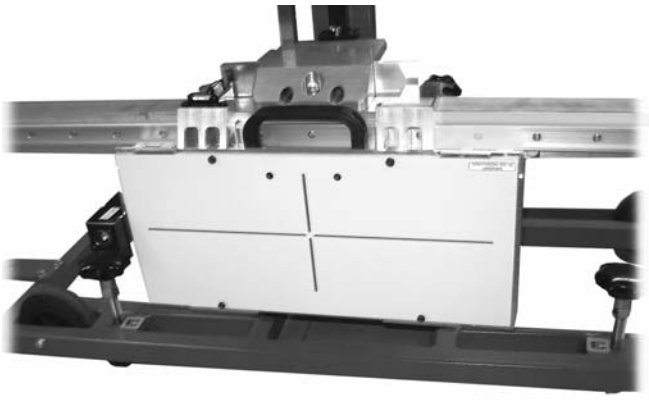
456_194

T40232 Removing tool (AC connections)



456_195

VAS 6613 ESD workstation



456_196

VAS 6430/06 Setting/calibrating tool for night vision assist

456_197

VAS 6606 Isolating box (prototype shown) for 196-pin control unit generation

Self-Study Programmes

This Self-Study Programme summarises all the information you need about the Audi A8 ’10.
For further information on the topics covered in this document, please refer to the relevant Self-Study Programmes.

SSP 457 Audi A8 ’10 Power transmission

- shift-by-wire gearshift mechanism
- Eight-speed automatic gearbox 0BL/0BK
- Rear axle drive 0BC/0BF/0BE
- Centre differential/splined prop shaft

Order number: A10.5S00.61.20

456_190

SSP 458 Audi A8 ’10 Suspension system

- Front axle/rear axle
- adaptive air suspension
- Audi dynamic steering (ADS)
- Brake system

Order number: A10.5S00.62.20

456_193

SSP 459 Audi A8 ’10 Onboard power supply and networking

- Topology
- FlexRay
- Light system
- LED headlights

Order number: A10.5S00.63.20

456_184

SSP 460 Audi A8 ’10 Convenience electronics and Audi tracking assist

- Control unit with display in dash panel insert J285
- Convenience system control unit J393
- Background lighting
- Audi tracking assist

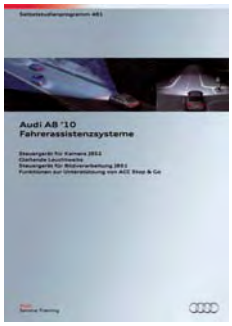
Order number: A10.5S00.64.20

456_191

SSP 461 Audi A8 ’10 Driver assistance systems

- New image processing system
- Camera control unit J852
- Intelligent light system with navigation assistance
- Image processing control unit J851
- Functions of the ACC Stop & Go image processing system

Order number: A10.5S00.65.20

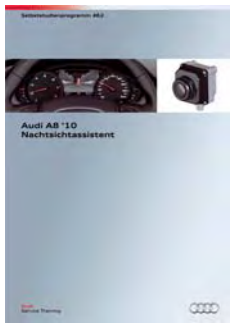


456_168

SSP 462 Audi A8 ’10 Night vision assist

- How night vision assist works
- Function operation and displays
- System components
- System overview
- Diagnostic functions and system calibration

Order number: A10.5S00.66.20



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