eSelf Study Program 990143

The 2015 Audi A3 Introduction

Audi Academy

Audi of America, LLC
Service Training
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Always check Technical Bulletins and the latest electronic service repair literature for information that may supersede any information included in this booklet.

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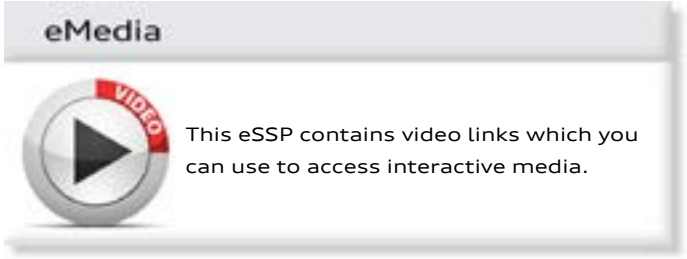

This eSelf Study Program teaches a basic knowledge of the design and functions of new models, new automotive components or technologies.
It is not a Repair Manual! All values given are intended as a guideline only.
For maintenance and repair work, always refer to the current technical literature.

Note

Reference

Introduction

The Audi A3 can look back on a 16-year success story. The first generation of the series, which debuted in 1996 as a three door, established an entirely new market segment – the premium compact class. In 1999 the five-door hatchback and the sporty Audi S3 completed the family. In total, around 990,000 vehicles were sold. The second generation, launched in 2003, was even more successful, achieving sales of approximately 1.8 million vehicles.

With the newest generation of the A3, the Group has set itself the goal of improving the fuel economy of its internal combustion engines, extending its product range to include alternative drive systems such as natural gas engines and electric motors, and equipping the vehicles with the latest technical innovations. The basis for implementing these objectives is the MQB or "modular transverse platform", a standardized architecture in which various vehicle components can be combined in any configuration on modular principles. This broadens the diversity of the model range, resulting in more efficient production, engines and combinations of materials.

The 2015 A3 sedan represents the cumulative technological expertise of Audi in a compact format. In its lightweight body, its interior architecture and its user interfaces, the A3 sedan will once again set standards in its class. Its engines impress with their efficiency and power, and the range of driver assistance systems and infotainment solutions is unparalleled in the premium compact class.

The lightweight body and newly developed engines have had major consequential effects throughout the vehicle, reducing the weight of many suspension, exhaust and interior components. At launch, the vehicle will be offered with two recently refined engines from the EA888 family. The Modular Infotainment Platform (MIB) makes its debut in the A3 sedan. It represents a big step forward in mobile communication electronics.

The A3 also sets new standards in the premium compact class when it comes to driver assistance systems. One of the most important of these is Audi pre sense. In the event of an impending collision, the system warns the driver in progressive stages and, if necessary, can initiate partial braking in order to reduce the car's speed at impact.

The Audi A3 and S3 sedans are assembled in Győr, Hungary. The site in northwestern Hungary is one of the largest automobile factories in the world. This is where Audi has assembled the TT coupe, and in the near future will assemble the A3 cabriolet. It is an ultra modern facility with the capability of complete production work—from stamping to final assembly.

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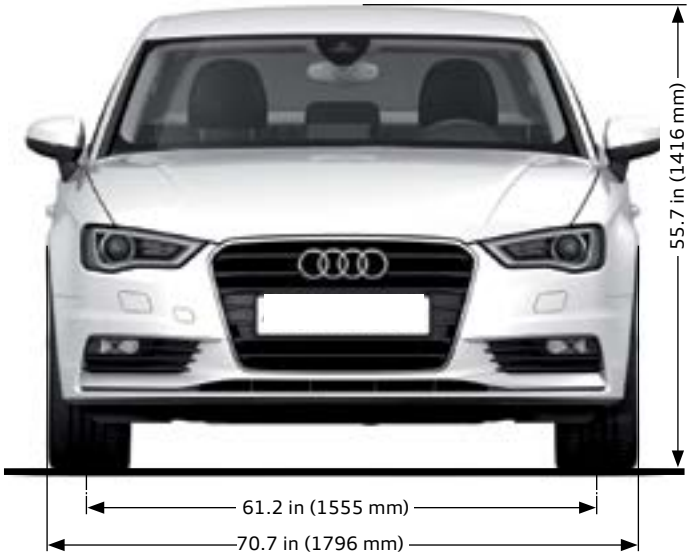
The A3 sedan body

Dimensions



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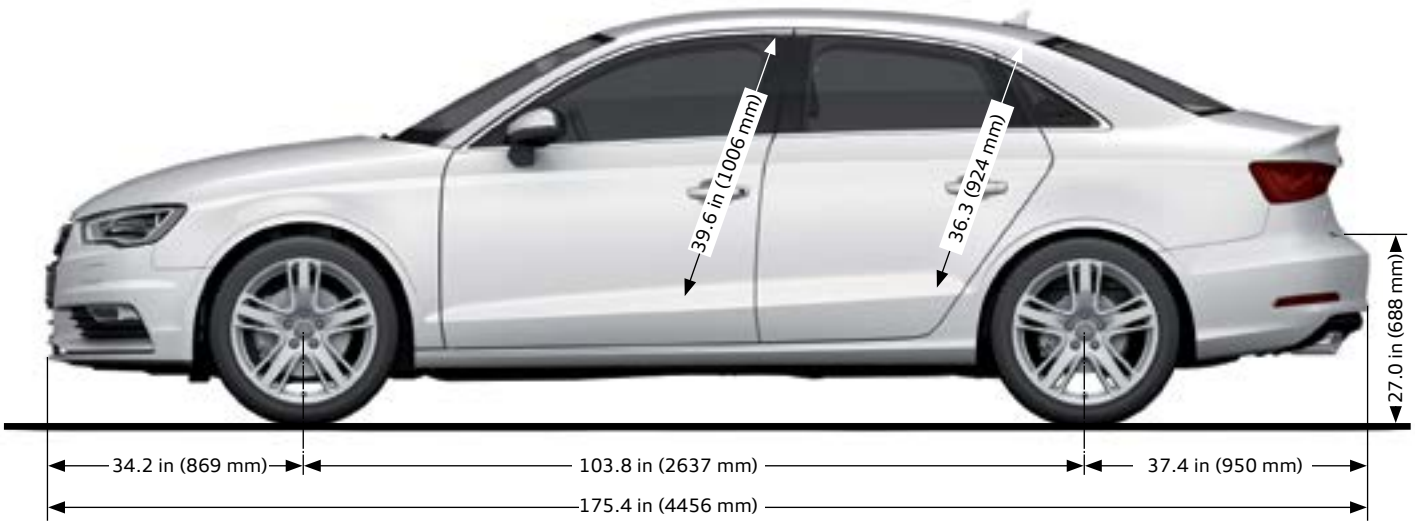

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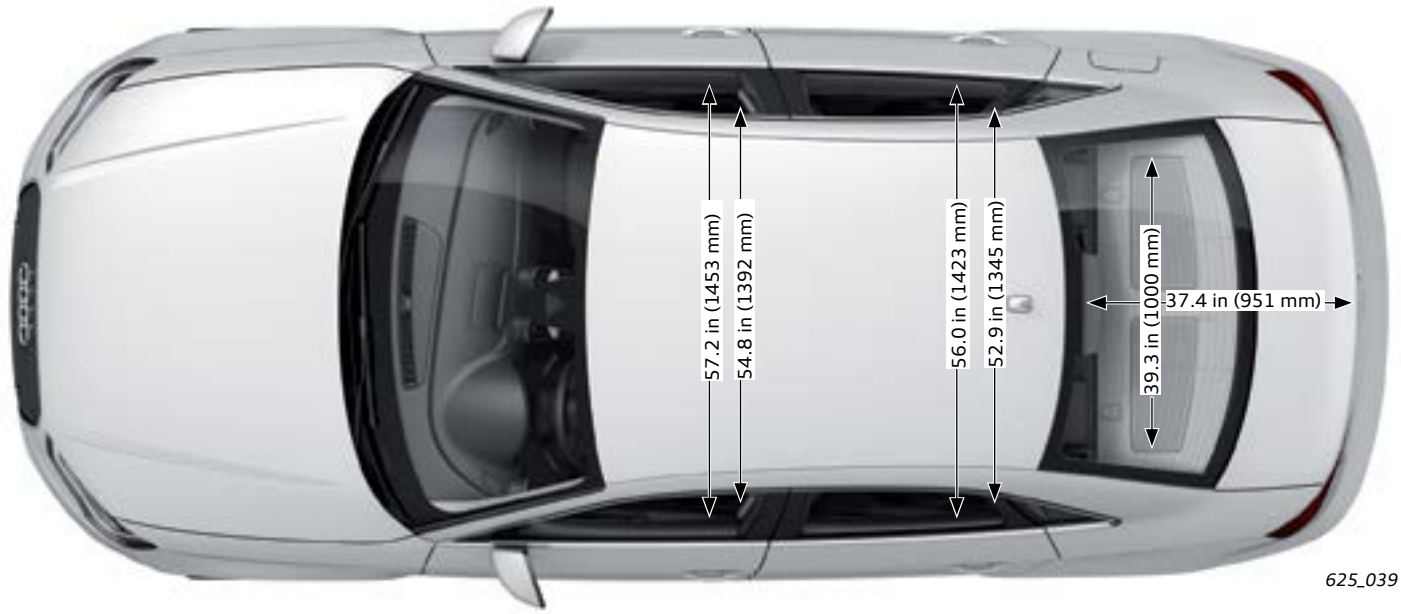
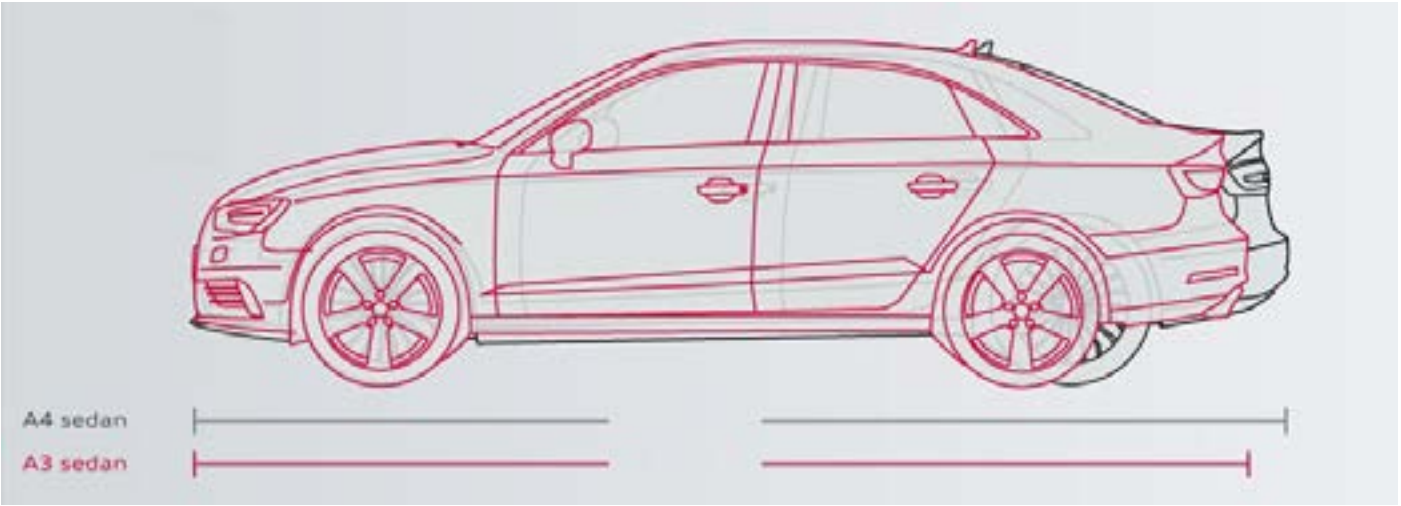


Dimensions and weight			
Length	175.4 in (4456 mm)	**Front elbow room**	57.2 in (1453 mm)
Width	70.7 in (1796 mm)	**Rear elbow room**	56.0 in (1423 mm)
Height	55.7 in (1416 mm)	**Front head room**	39.6 in (1006 mm)
Front track width	61.2 in (1555 mm)	**Rear head room**	36.3 (924 mm)
Rear track width	60.0 in (1526 mm)	**Load pass-through width**	39.3 in (1000 mm)
Wheelbase	103.8 in (2637 mm)	**Load lift-over height**	27.0 in (688 mm)
		Luggage compartment volume	15.0/31 [1] cu ft (425/880 [1] l)
Curb weight (approximate)	2899.0 lb (1325 kg)		
Permissible total vehicle weight	4111.6 (1865 kg)		

[1] Rear seat folded

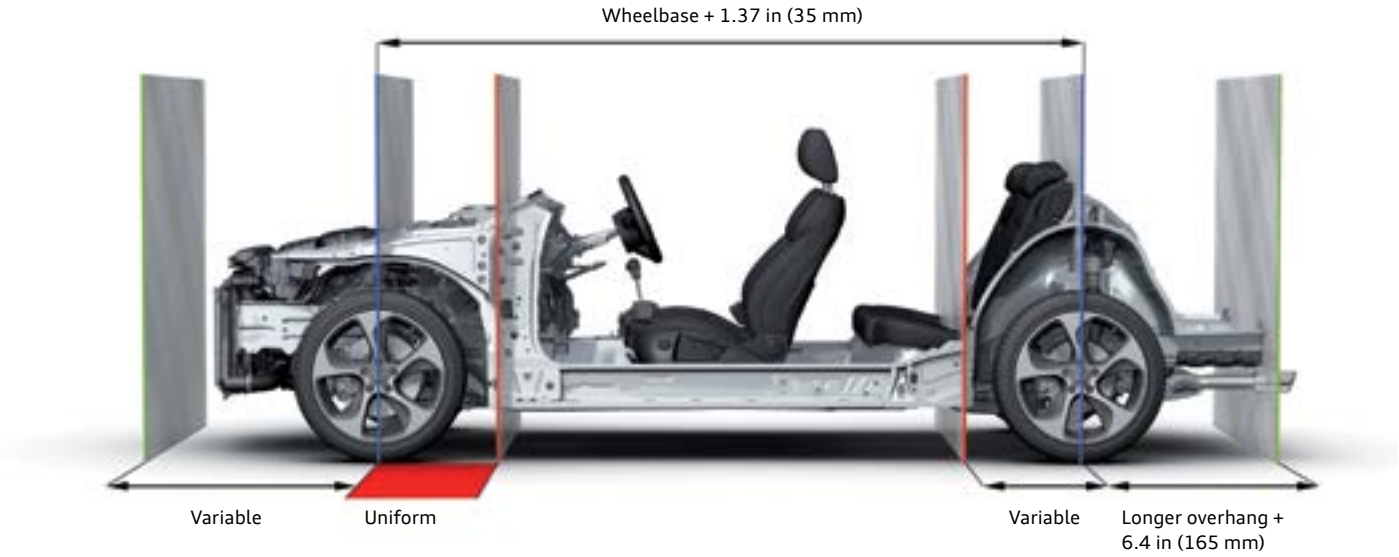


A3 sedan compared to A4 sedan

Vehicle architecture (MQB)

The Audi A3 sedan builds on the body structure of the three-door A3. It is part of the MQB strategy used by the Volkswagen Group of which Audi is a part. MQB stands for modular transverse baukasten or modular transverse platform.

It is not so much a platform per-se, but rather a system for introducing commonality across disparate platforms that share the same engine orientation — regardless of model, vehicle size or brand. MQB uses a core group of components across a wide variety of platforms — for example, sharing a common engine-mounting for all drivetrains. The concept allows diverse models, including those from the company's various brands, to be manufactured at the same plant, further saving cost.



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MQB and the Audi A3

The underbody of the A3 series consists of 3 modules:

- the front section
- Floor pan, center section
- Trunk floor

Compared to the three-door A3, the A3 sedan needed a longer central floor pan and a longer rear floor pan but are based on the same basic design and manufacturing processes.

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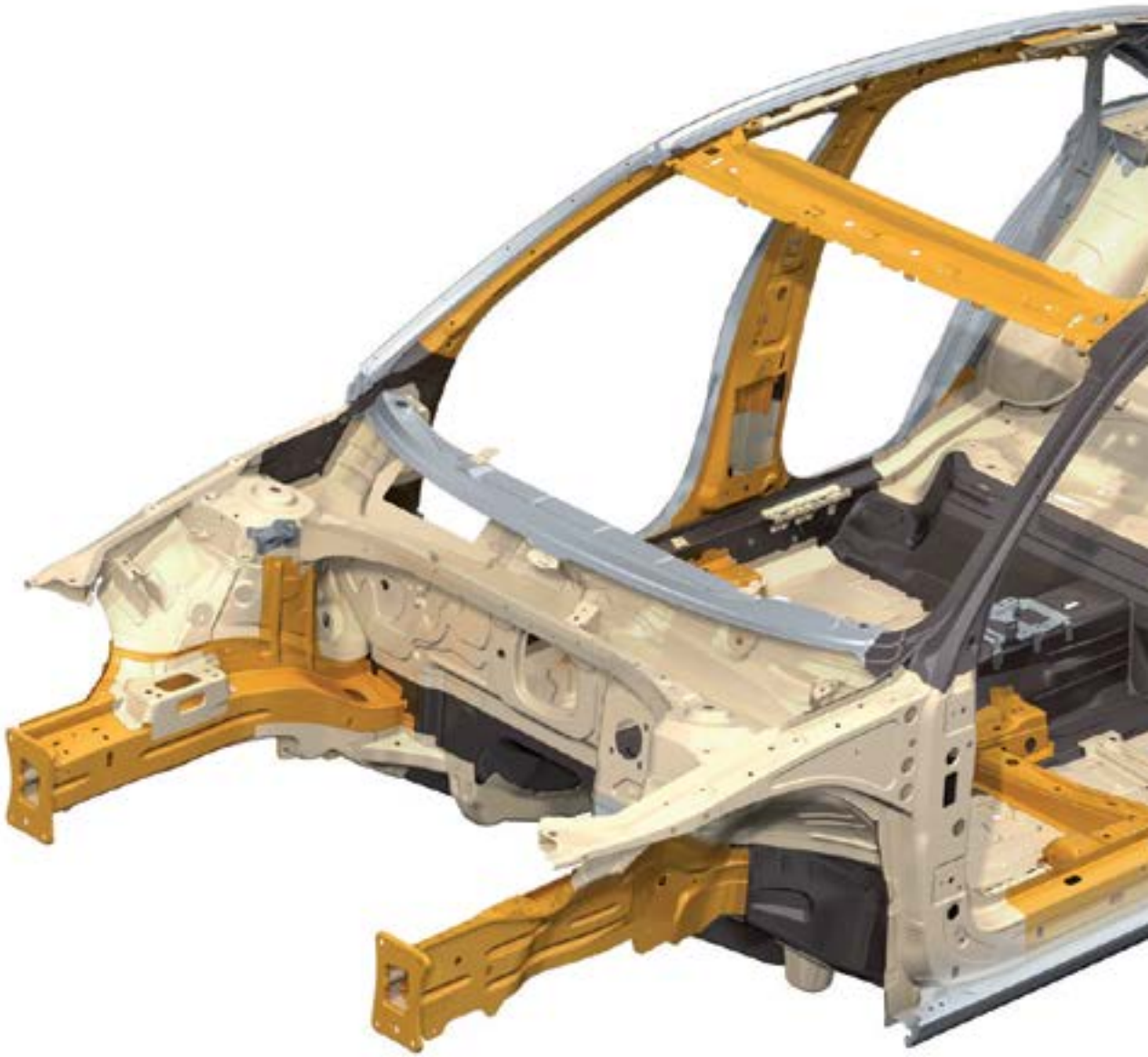
Notes

Materials - ultra lightweight construction

Body developers at Audi have broad-based engineering expertise spanning all relevant materials. This know-how is not limited to just a specific material, rather the motto is: “The right material at the right place for optimal function.” The multi-material body of the Audi A3 lives up to this maxim.

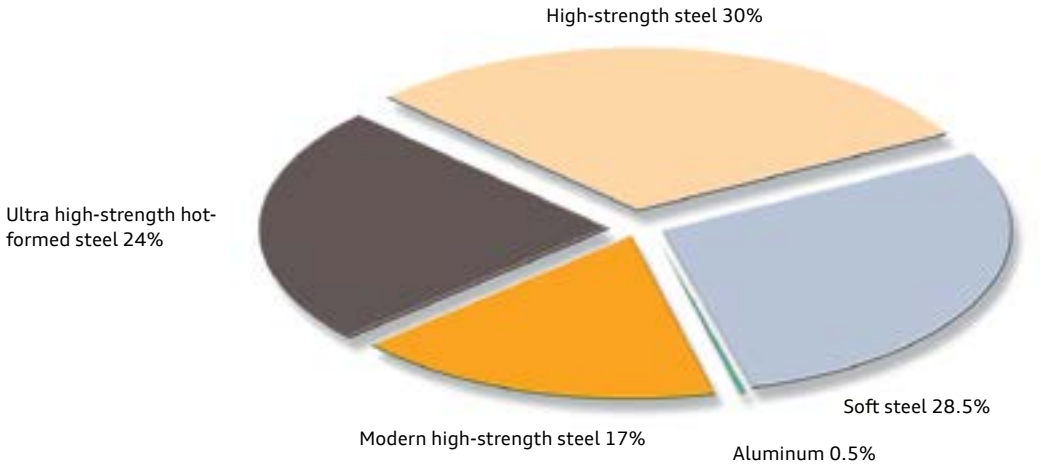
All the ultra lightweight design principles that have made all A3 models lighter than their predecessors have been applied to the design of the new A3 sedan.

At the same time, the A3 sedan meets the highest demands in the area of vehicle safety. The basis for this is that only materials used are those that meet the high quality standards of Audi.



Ultra high-strength hot-formed steel components

Ultra high-strength hot-formed steel components provide approximately a 24% share of the A3 sedan body structure. Before the components are stamped, special steel is heated to nearly 1832 °F (1000 °C) in a continuous oven. After heating, it is immediately placed in a water cooled press tool. The steel is quickly cooled to approximately 392 °F (200 °C) before it is stamped. The rapid cooling of the steel changes its iron/carbon structure and creates a steel with high tensile strength which in turn allows thinner wall thicknesses for the particular components. Steels created in this manner require special care and procedures during repairs.



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A3 sedan B pillar

The B-pillar with striker plate is partially tempered during the forming process. The component assembly is very hard at the top end and softer below a narrow transition zone. This enables side impact forces to be absorbed effectively.

625_111

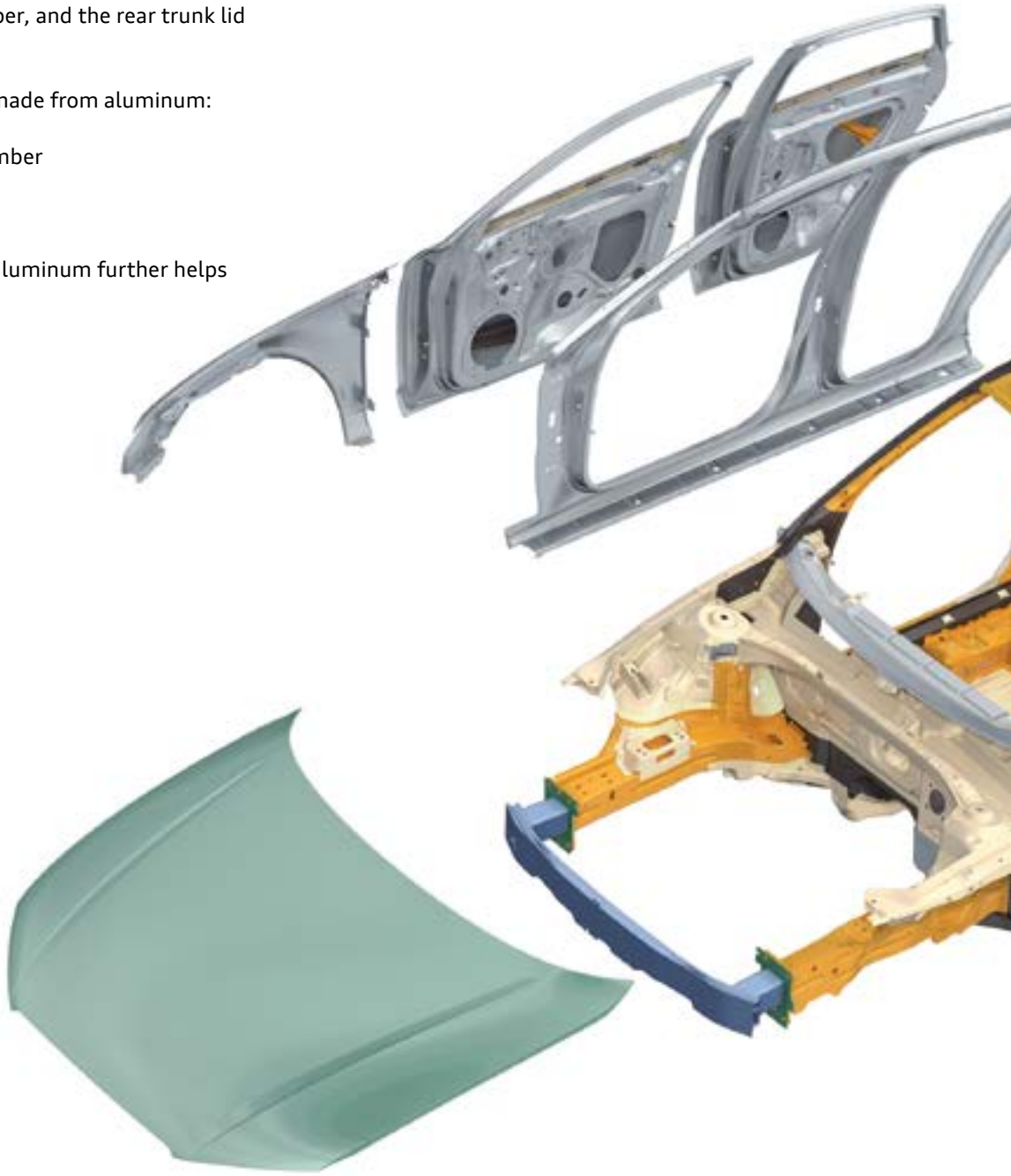
Body panels

Some inner and outer body panels such as the fenders, doors, rear bumper, cross member, and the rear trunk lid are all made from light steel.

The following components are made from aluminum:

- the front bumper cross member
- the hood
- the rear hat shelf

The use of both light steel and aluminum further helps reduce the weight of the body.



Joining techniques

Both old and new body component joining techniques are in use. In addition to the 4803 classic resistance spot welds used during assembly of the body, the following joining methods are also used:

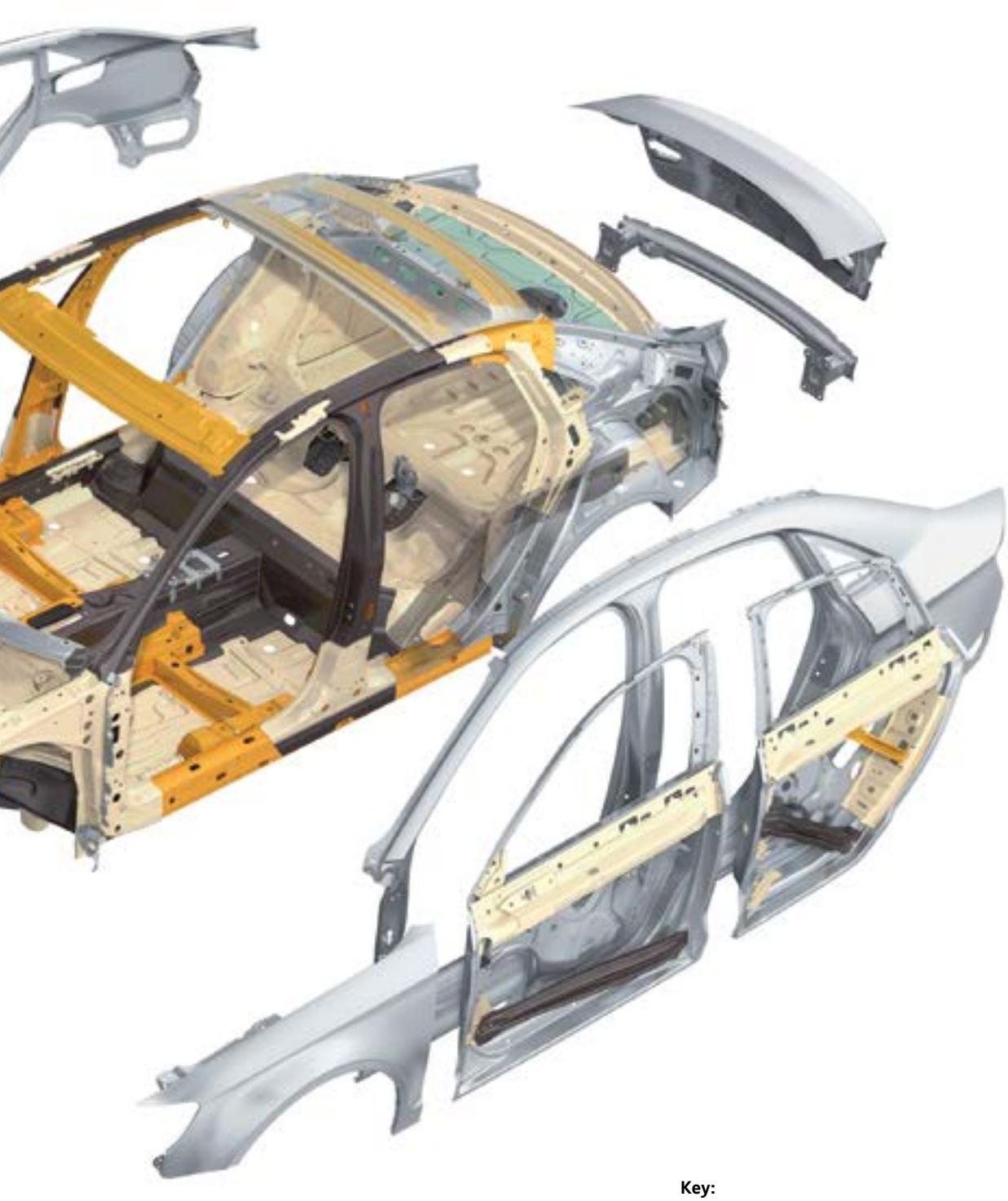
- MAG welding
- Laser welding
- Clinching (attachments only)
- Solid punch riveting

In each A3 sedan there are over 196 ft (60 m) of glued joints.

The joint between the body side wall and roof is laser welded and then smoothed by brushes to produce a nearly invisible zero joint.

The water drainage paths in the area of the rear trunk lid are joined by Plasmatron welding.

To save more weight, doors and window frames are pressed in one piece. The inner and outer doors are welded by the ultra-modern remote laser technique.



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Key:

- Ultra high-strength hot-formed steel
- Modern high-strength steel
- High-strength steel
- Soft steel
- Sheet aluminum
- Aluminum profile

Ultra high strength hot-formed steel components are installed in the following areas

Forming the backbone of the occupant cell is what are known as form-hardened steels. An extreme temperature change during forming process gives these steels extremely high strength; the parts can be designed with relatively thin walls, making them lightweight.

Form-hardened steels represent a 24 percent share of body materials. They are used in the transition from the front of the vehicle to the occupant cell, in the A-pillars, B-pillars, roof arch, center tunnel, side sills and floor panels. Altogether, they lower the car's weight yet provide excellent strength.

625_114

① Long members (2 left / 2 right)

② Upper foot room crossmember

③ Lower foot room crossmember

④ Left and right inner A pillars

⑤ Left and right inner rocker panels

⑥ Center tunnel

⑦ Rear seat crossmember

⑧ Rear transverse crossmember

⑨ Left and right upper A pillars

⑩ Left and right rear long members

⑪ Left and right inner B pillars

Panorama tilt sunroof

The 2015 A3 sedan features an optional panorama slide/tilt sunroof.

The roof opening is larger than that of an internally guided sunroof and creates a particularly airy and spacious interior feel for the occupants.

609_069b

Thermal insulation

The glass roof panel is tinted and provides additional thermal insulation. Thermal insulation is provided by the following reflective components:

- 99 % UV radiation reflection
- 92 % heat radiation reflection
- 90 % light radiation reflection

The panorama slide/tilt sunroof module meets the statutory requirements for anti-pinch protection.

609_083

Roof installation

The panorama slide/tilt sunroof is glued into the roof opening and thus is a major factor contributing to body rigidity.

609_122b

609_070

Component overview

609_071

Bumper system

Front bumper

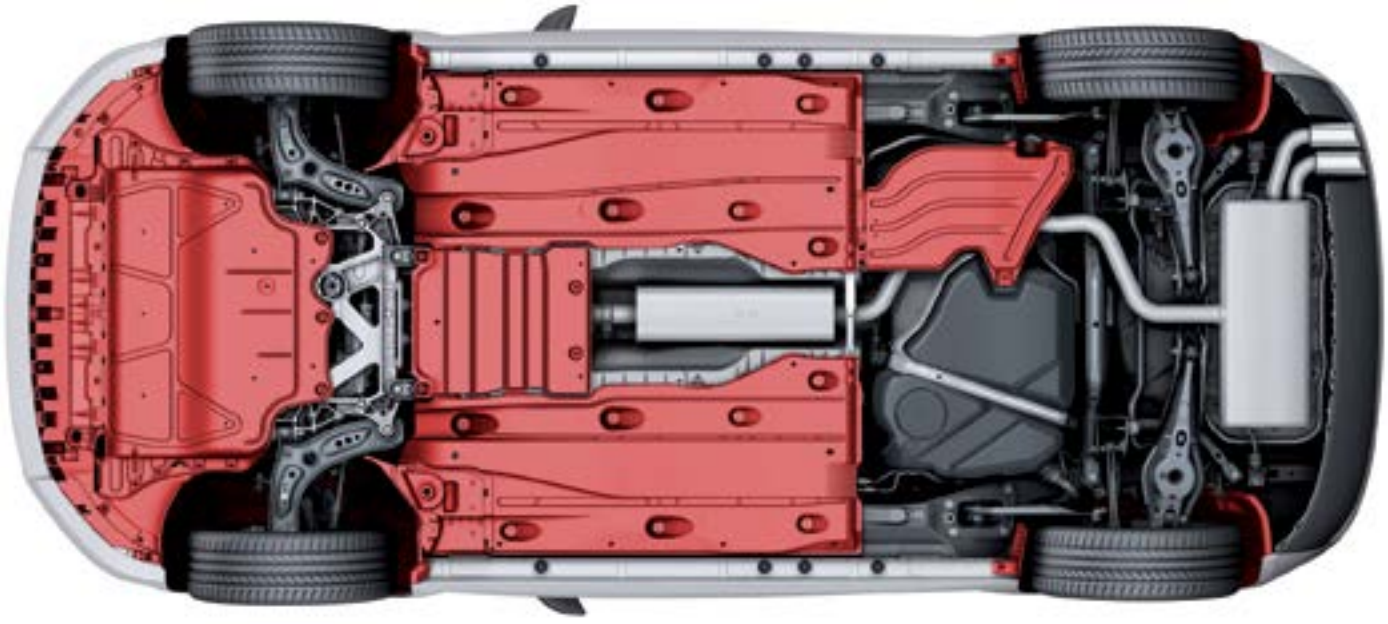
Characteristic elements of the vehicle's front end are the one-piece bumper cover and single-frame radiator grille. Large air intakes are located at the lower front.

609_072

Underbody

The Audi A3 has a highly effective acoustic and aerodynamic underbody designed to withstand mechanical and thermal stresses. In addition to aerodynamics, attention was paid to sound absorption, body protection and thermal engine management during the development phase.

The result is improved airflow around the engine and transmission capsule, the cross-members and the wheel arches, thus allowing a low drag coefficient (c_w) of 0.31 to be achieved.



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Passive safety

Components

The passive occupant protection system has the following components:

- Airbag control module
- Driver and passenger airbags
- Front side airbags
- SIDEGUARD® head airbags
- Driver and passenger side knee airbag
- Front airbag crash sensor
- Crash sensors for side impact detection in the doors
- Crash sensors for side impact detection in the C pillars
- Front inertia reel seat belts with electric and pyrotechnic belt tensioners
- Safety belt warning for all seats
- Safety belt switches on all seats in the seat belt buckles
- Safety occupancy sensor in front passenger seat

625_050

Optional equipment

- Rear passenger side impact airbags

Key to illustration on page 20:

E24 Driver Seat Belt Switch
E25 Front Passenger Seat Belt Switch
E258 Driver Side Rear Seat Belt Switch
E259 Passenger Side Rear Seat Belt Switch
E609 Center Rear Seat Belt Switch

G452 Front Passenger Seat Occupant Sensor
G179 Driver Side Airbag Crash Sensor
G180 Front Passenger Side Airbag Crash Sensor
G256 Driver Side Rear Side Airbag Crash Sensor
G257 Passenger Side Rear Side Airbag Crash Sensor
G283 Driver Front Airbag Crash Sensor
G284 Passenger Side Front Airbag Crash Sensor
G551 Driver Belt Force Limiter
G552 Front Passenger Belt Force Limiter
G553 Driver Seat Position Sensor
G554 Passenger Seat Position Sensor

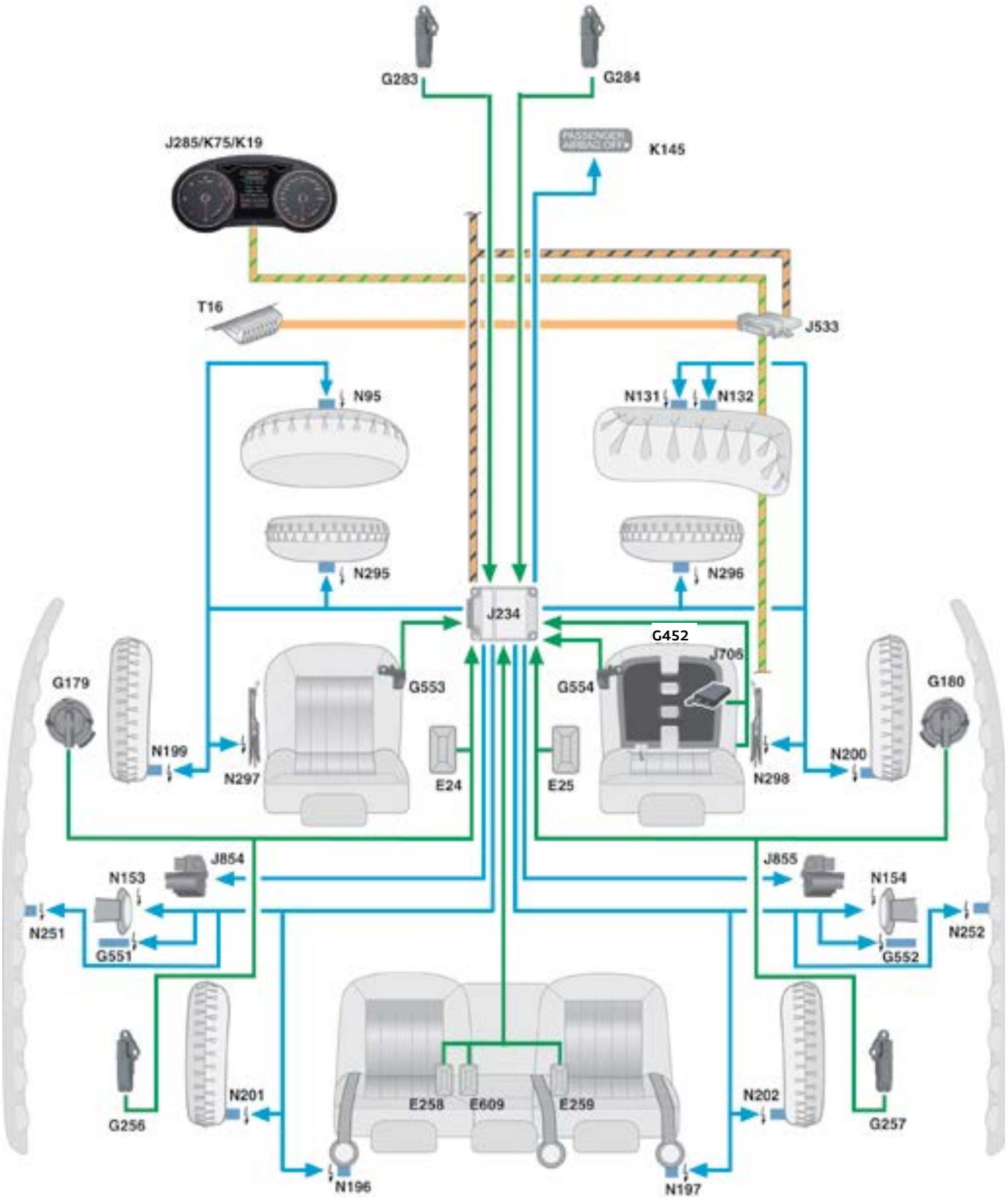
J234 Airbag Control Module
J285 Instrument Cluster Control Module
J533 Data Bus On-Board Diagnostic Interface
J854 Left Front Seat Belt Tensioner Control Module
J855 Right Front Seat Belt Tensioner Control Module

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

N95 Driver Airbag Igniter
N131 Front Passenger Airbag Igniter 1
N132 Front Passenger Airbag Igniter 2
N153 Driver Seat Belt Tensioner Igniter 1
N154 Front Passenger Seat Belt Tensioner Igniter 1
N199 Driver Thorax Airbag Igniter
N200 Front Passenger Thorax Airbag Igniter
N201 Driver Side Rear Thorax Airbag Igniter
N202 Passenger Side Rear Thorax Airbag Igniter
N251 Driver Head Curtain Airbag Igniter
N252 Front Passenger Head Curtain Airbag Igniter
N295 Driver Knee Airbag Igniter
N296 Front Passenger Knee Airbag Igniter
N297 Driver's Seatbelt Tensioner Igniter 2
N298 Front Passenger Seatbelt Tensioner Igniter 2

T16 Data Link Connector

System overview



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Legend:

Powertrain CAN bus

Diagnosis CAN bus

Input signal

Convenience CAN bus

Output signal

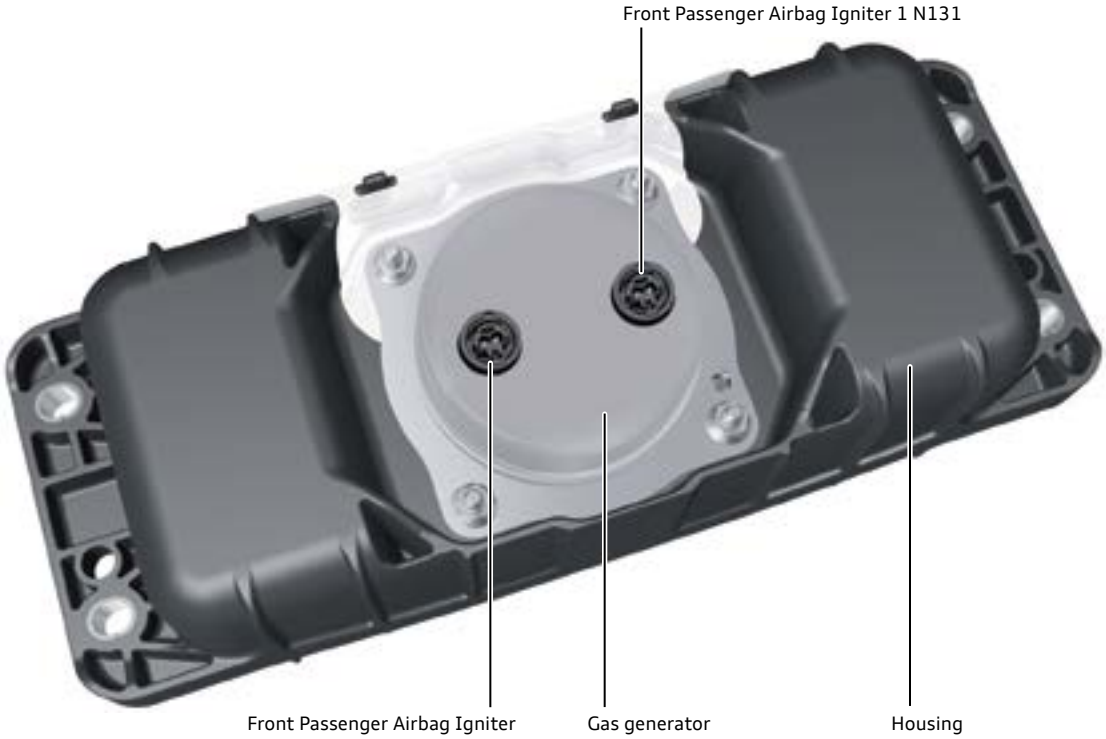
Vehicle Airbags

625_050

Passenger front airbag

The 2015 A3 sedan for the North American market will come equipped with a two-stage adaptive hybrid gas generator front passenger airbag.

Based on accident parameters, Airbag Control Module J234 determines the time interval at which Front Passenger Airbag Igniter 2 N132 is activated after Front Passenger Airbag Igniter 1 N131.



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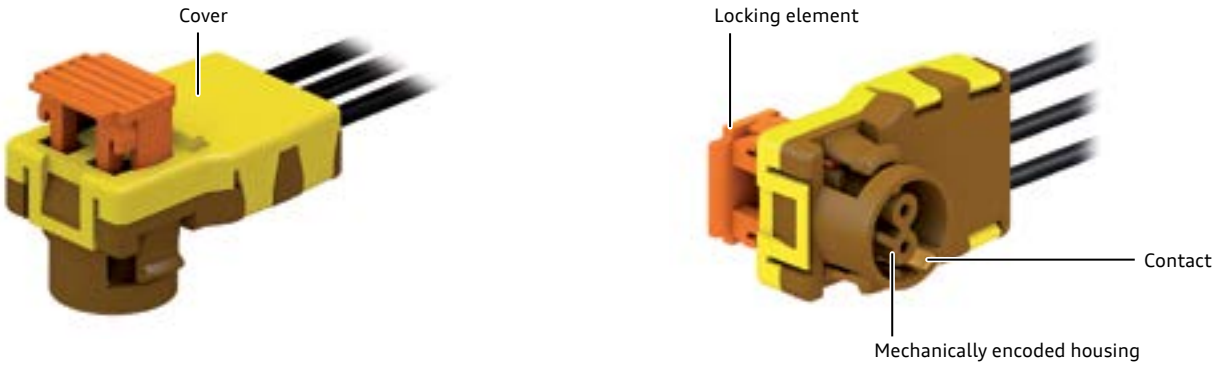
New generation of connectors

A new locking style connector is used on front passenger airbag that incorporates a ground wire connected to the vehicle body.

The ground circuit provides protection from electro-static discharge. The connector has been mechanically encoded so it can only be installed in one way.



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Driver and passenger knee airbags

The Audi A3 sedan is equipped with both driver and passenger knee air bags. Both airbags use tubular hybrid gas generators.

Driver Knee Airbag

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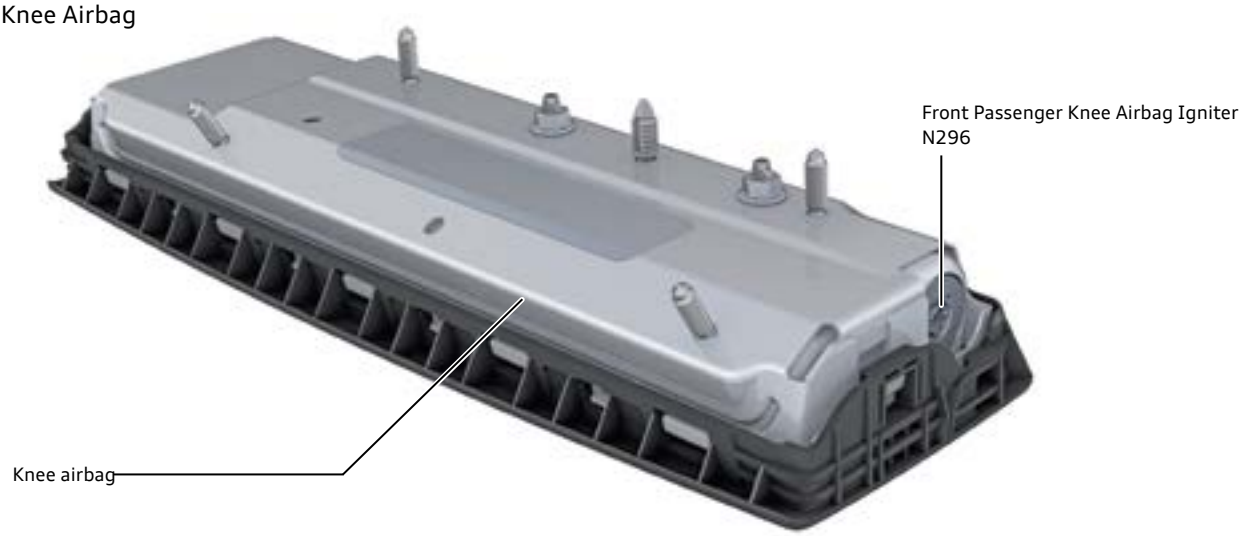
Passenger Knee Airbag



Driver Front Airbag Crash Sensor G283 Passenger Side Front Airbag Crash Sensor G284

The A3 sedan for the North American region uses two up-front sensors for detection of front and/or rear collisions. They work in conjunction with Airbag Control Module J234.

These sensors are accelerometers that measure the acceleration, deceleration and longitudinal direction of the vehicle.

625_052

Front Passenger Seat Occupant Sensor G452 Passenger Occupant Detection System Control Module J706

The task of the seat occupancy detection system is to determine the following:

1. If the seat is occupied by a child or if a rearward facing child seat is installed.

2. If an adult is seated.

Passenger Occupant Detection Control Module J706 evaluates the signals from Front Passenger Seat Occupant Sensor G452. If J706 recognizes an empty passenger seat or that a rearward facing child seat is installed, it instructs Airbag Control Module J234 to disable the passenger front airbag and knee airbag.

This means that in the event of a collision, neither the passenger front airbag nor front passenger knee airbag would deploy.

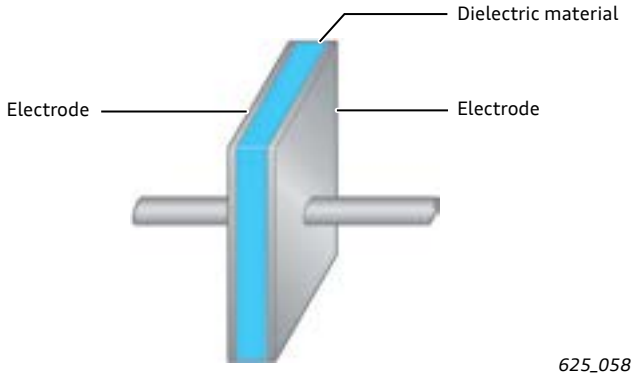
Front passenger Airbag -disabled- Indicator Lamp K145 in the instrument panel warns the driver of the status of the passenger airbag and knee airbag. If Airbag Control Module J234 has disabled these airbags based on the signals from J706, warning lamp K145 will remain illuminated.

In addition to the warning lamp, Airbag Control Module J234 will also issue an optical and acoustic warning if the seat is unoccupied or if a safety belt has been unbuckled. Detection of an unbuckled belt is determined by a signal from Front Passenger Seat Belt Switch E25.

Front Passenger Seat Occupant Sensor G452

G452 is a capacitor-type sensor. A capacitor is made of two plates (electrodes) and an insulator (dielectric), sandwiched between them.

When voltage is applied to one of the electrodes and the other electrode is connected to the battery's negative terminal, the capacitor begins to accumulate energy. The capacitance of a capacitor can be altered by varying the size of the electrode plate or the dielectric.



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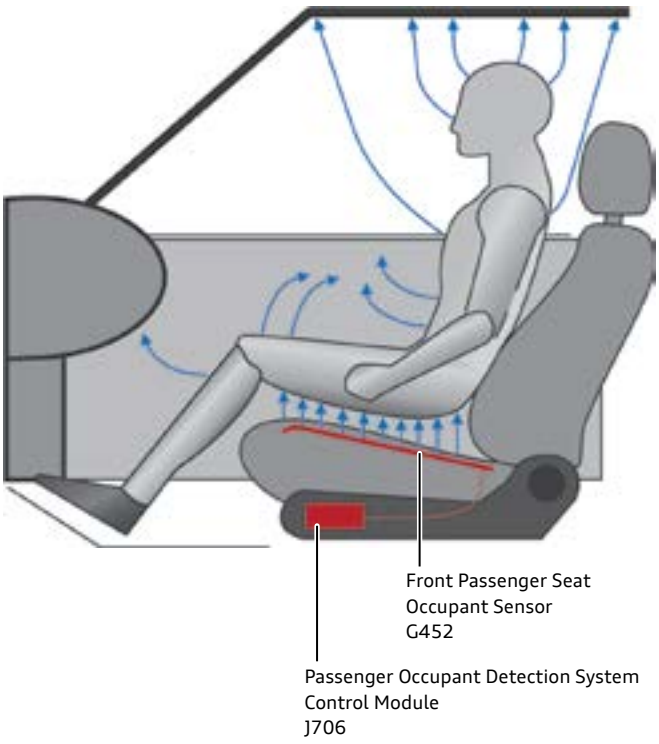
Function

With this type of occupant detection system, the vehicle body and sensor G452 represent the two plates of the capacitor. These components obviously do not change in size.

The dielectric consists of the upholstery, the atmosphere, the adjoining seat trim parts and the occupant. The capacitance will change due to the liquid content of the occupant's body compared to when the seat is unoccupied or if a rear facing child seat is installed. This capacitance signal data is interpreted by Passenger Occupant Detection System Control Module J706 to determine if the seat is occupied or not.



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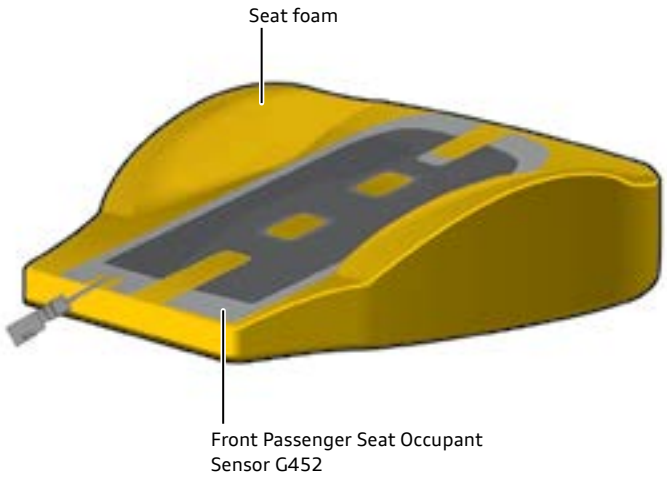
Installation location

G452 is installed under the seat cover but on top of the seat heater elements.



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Passenger Occupant Detection System Control Module J706

In principle, J706 measures the capacitance of Front Passenger Seat Occupant Sensor G452.

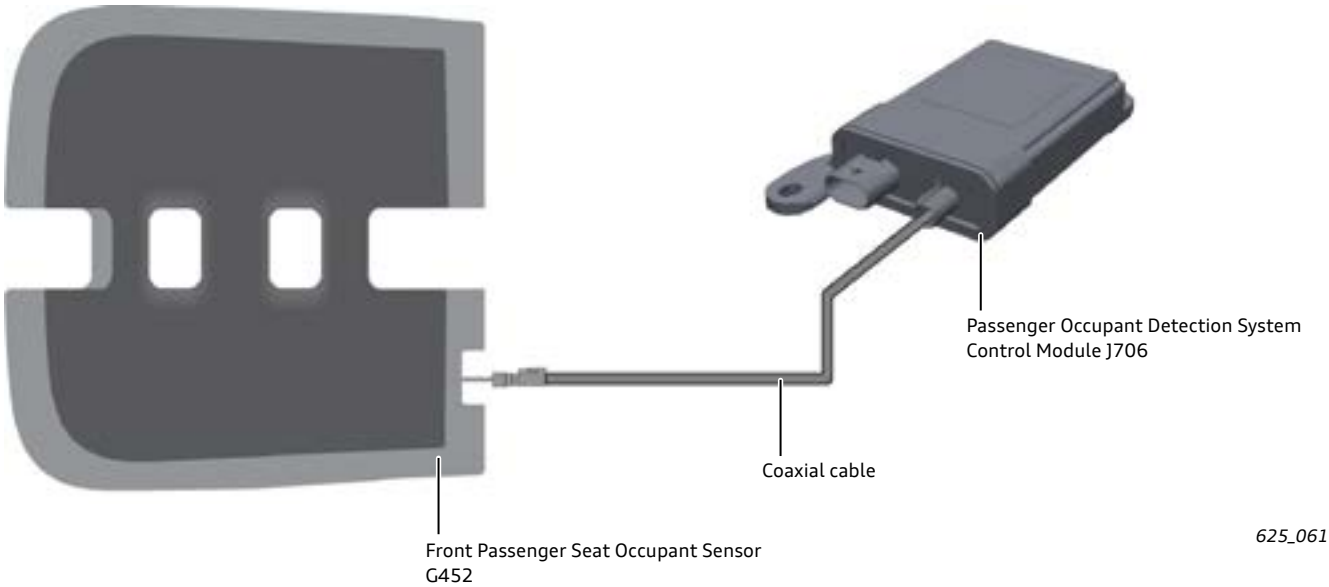
The values from J128 are read cyclically by J706 and transferred to Airbag Control Module J234 via a LIN bus.

Diagnosis

J706 is connected to G452 via a coaxial cable and is supplied assembled to the factory as a unit. The coaxial cable and the plug of the coaxial cable must not be repaired. There are different seat variations and thus different controls module variations for J706. The software in the ECU is matched to the respective seat.

Control module J706 and sensor G452 cannot be replaced separately. They are matched during production. If they are replaced, a Basic setting must be performed with the Scan Tool. During this basic setting the serial number of the installed components are entered into the Airbag Control Module.

Serviceable components



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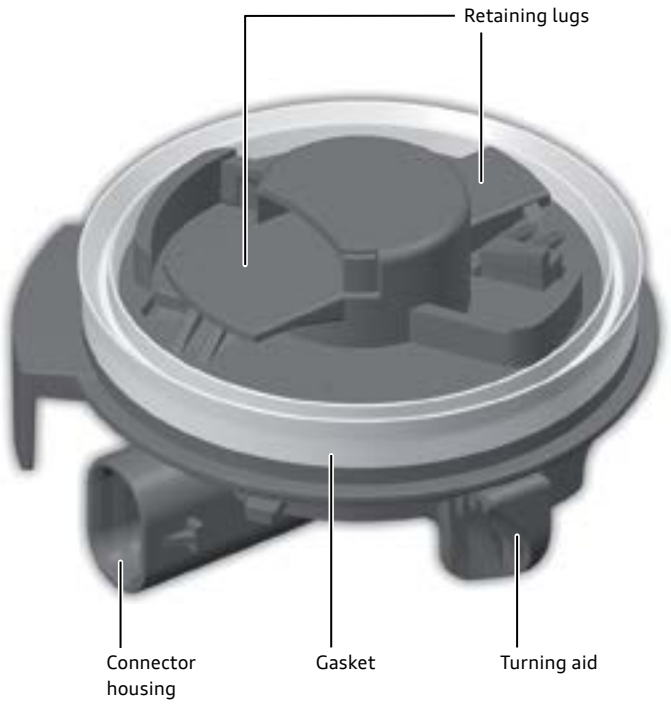
Reference
Please refer to the latest repair and parts information when replacing the seat sensor and control module.

Side airbag crash sensors

The side airbag crash sensors for the driver and passenger sides (G179 and G180) are capacitive pressure sensors.

The pressure sensors have a new mounting concept and are no longer bolted to the inner door panel The pressure sensors are inserted into the inner door panels and then secured into place by twisting.



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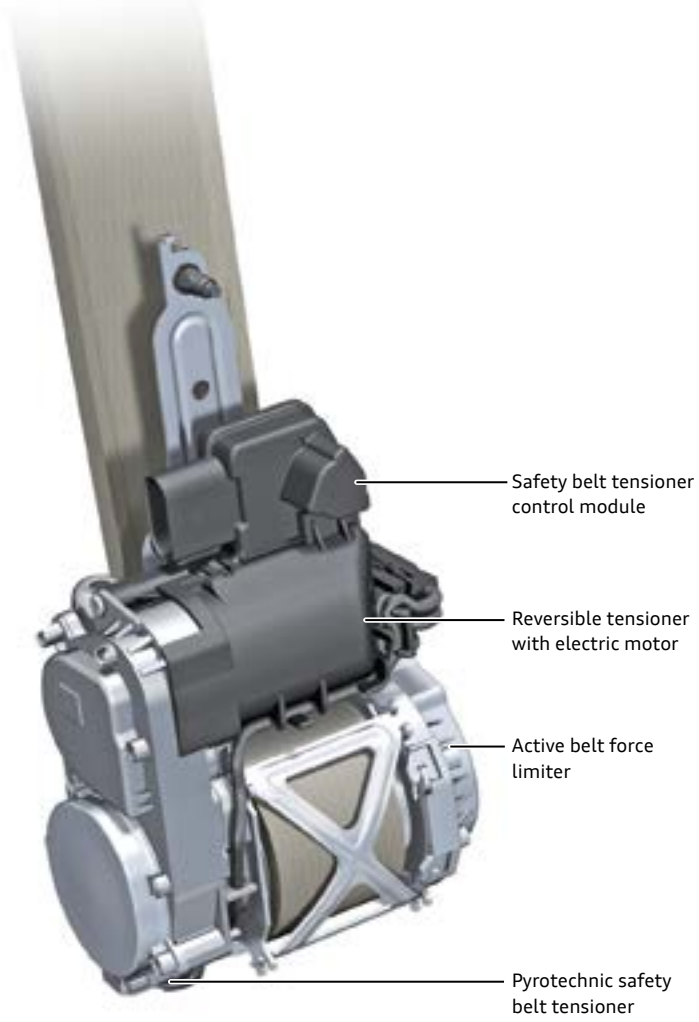
Front safety belt tensioner

In combination with Audi pre sense basic, the 2015 Audi A3 is equipped with reversible safety belt tensioners driven by electric motors. This is in addition to the pyrotechnic belt tensioners.

Airbag Control Module J234 operates Left and Right Seat Belt Tensioner Control Modules J854 and J855 as LIN modules.

When Audi pre sense basic detects specific driving situations, signals are sent to the data bus. The airbag control module evaluates the signals and, if necessary, instructs the seat belt tensioner control module to partially or fully tension the safety belts via an electric motor. For further information on Audi pre sense, refer to the chapter on Active safety, page 31.

The automatic safety belt retractors use rack-type pyrotechnic belt tensioners. If an automatic seat belt retractor with seat belt tensioner control module is replaced, the basic setting procedure must be performed using the “Guided Fault Finding“ function.



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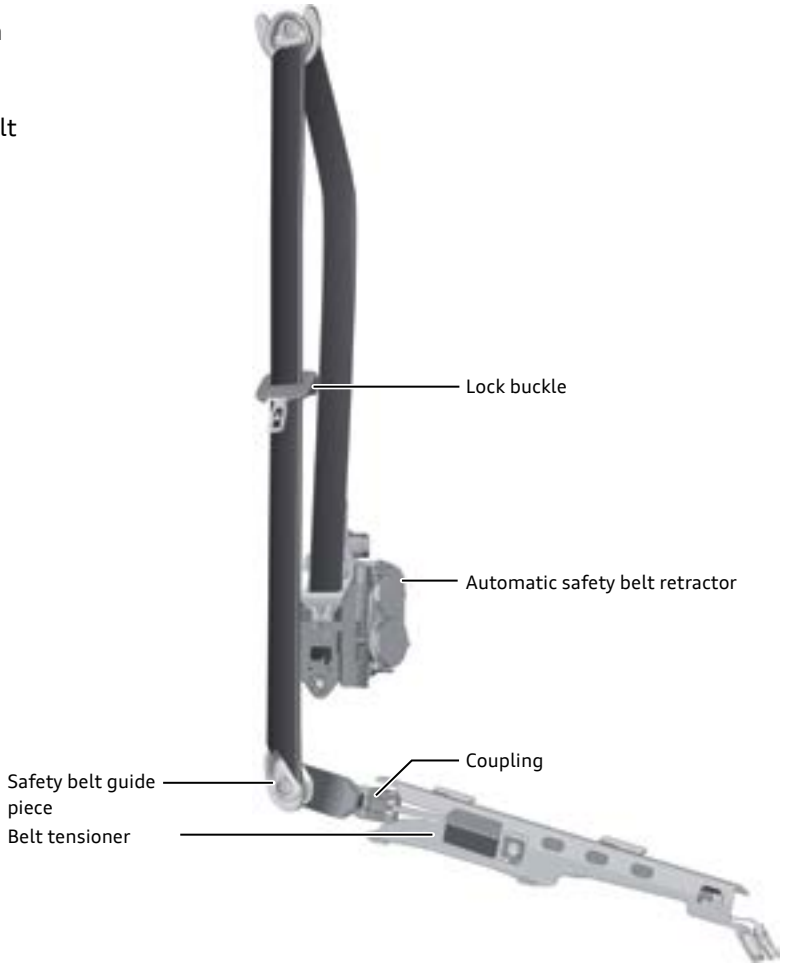
Pelvic belt tensioner with locking buckle

Depending on the country version, the 2015 A3 sedan can be equipped pyrotechnic tensioning safety belts that help to reduce injury to the pelvic area during certain types of collisions. The safety belts are deployed by Driver Seat Belt Tensioner Igniter 2 N297, and Front Passenger Seat Belt Tensioner Igniter 2 N298.

Vehicles with this style safety belts will also have a new locking-type buckle.

In certain types of accidents, the pelvic belt tensioners, in conjunction with the new locking buckle, help protect the occupant in the following manner:

- To help separate the pelvic force from the thoracic force
- To help reduce the chest deflection force
- To help limit the movement of the pelvis
- To help improve the contact between the pelvis and seat



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Operation during an accident

When Airbag Control Module J234 determines the criteria for an accident severe enough to deploy the pyrotechnic safety belts has been exceeded, the shoulder portion of the safety belt is tensioned from the clamping point of the locking buckle in the direction of the belt tensioner by the pyrotechnic devices in the automatic safety belt retractor. At the same time, N297 and N298 are triggered and the lap portion of the safety belt is tensioned by the movement of a steel cable attached to the safety belt.

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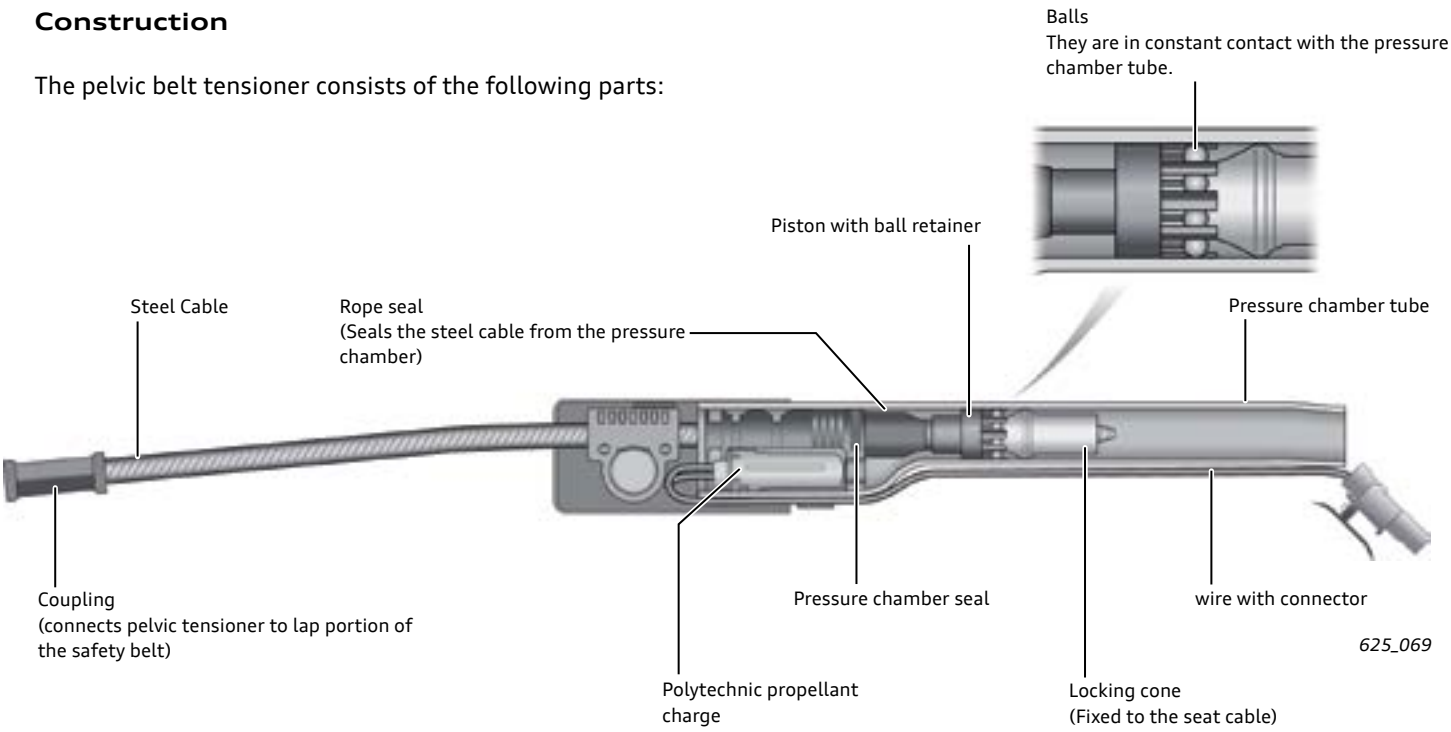
Pelvic belt tensioner

Construction

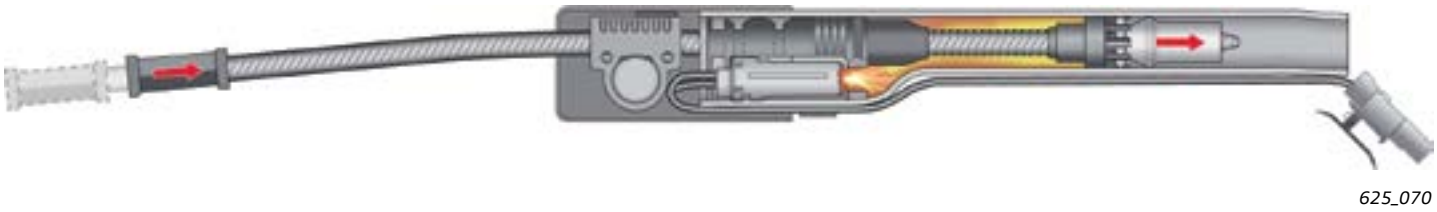
The pelvic belt tensioner consists of the following parts:



Function - Ignition and Pelvic belt tensioning

When a signal from Airbag Control Module J234 ignites the pyrotechnic pelvic belt tensioner propellant there is a sudden increase in the pressure chamber.

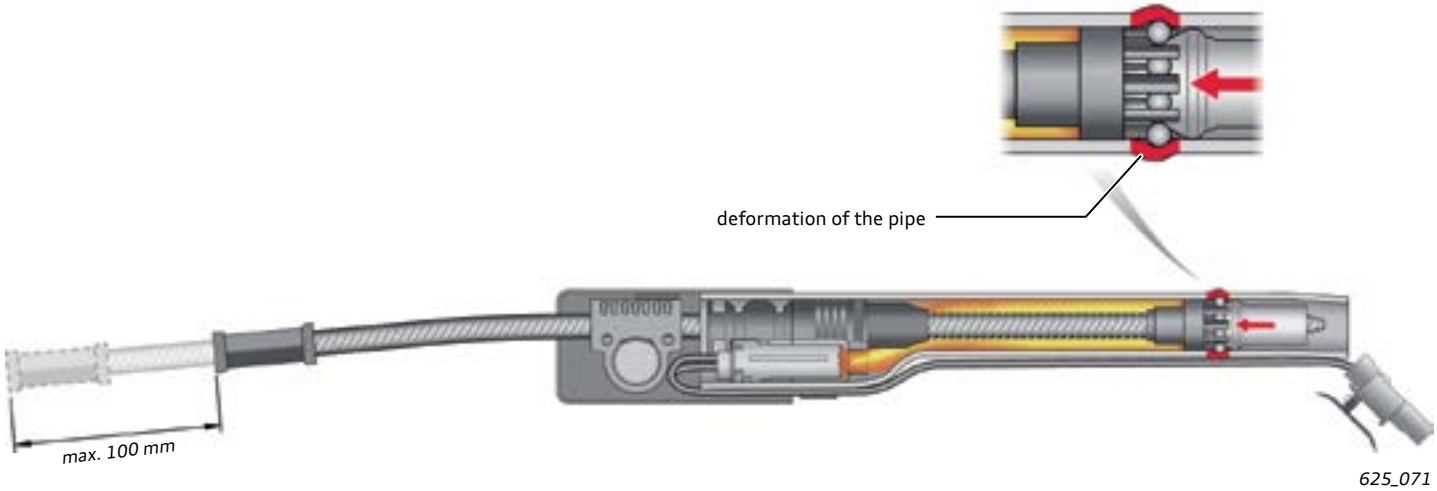
The sudden increase in pressure propels the piston, balls and locking cone and steel cable forward.



Function - Locking

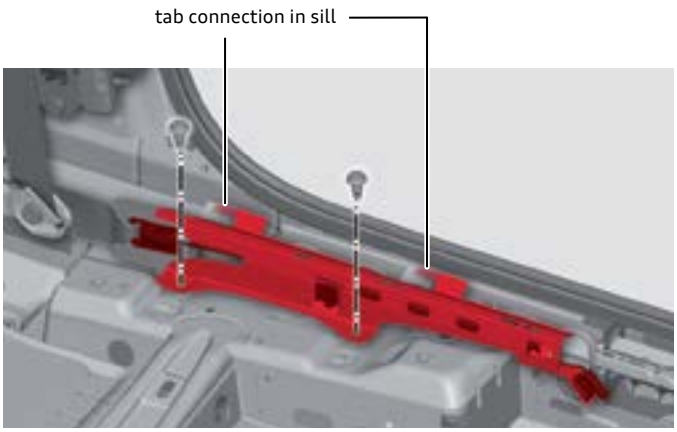
Because the steel cable is connected to the lap portion of the safety belt, the belt is tightened by approximately 4.0 in (100 mm) when the igniter is triggered. The locking buckle acts as a load fixing point and anchors the lap portion of the safety belt at the buckle.

When the cable has reached its limit, there is a small reactive backward movement. This forces the balls to move against the cone shape of the piston and deform the inner tube of the pressure chamber. This prevents cable from returning and holds the safety belt firmly against the occupant's lap.



Installation location

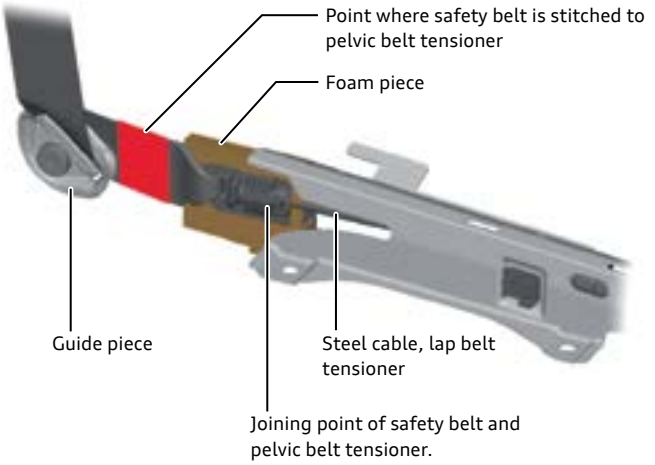
The pelvic belt tensioner is located by tabs and then bolted into place along the lower inner front door sill.



625_072

Coupling point

The end of the lap portion of the safety belt is routed through a guide piece and stitched to a joining piece of the pelvic belt tensioner assembly. A foam piece covers the joined pieces to prevent noise.



625_064

Locking buckle

A newly designed safety belt buckle is used. The lock buckle prevents movement and forms a separate load path for the shoulder and lap portion of safety belt in the event of an accident.

625_065

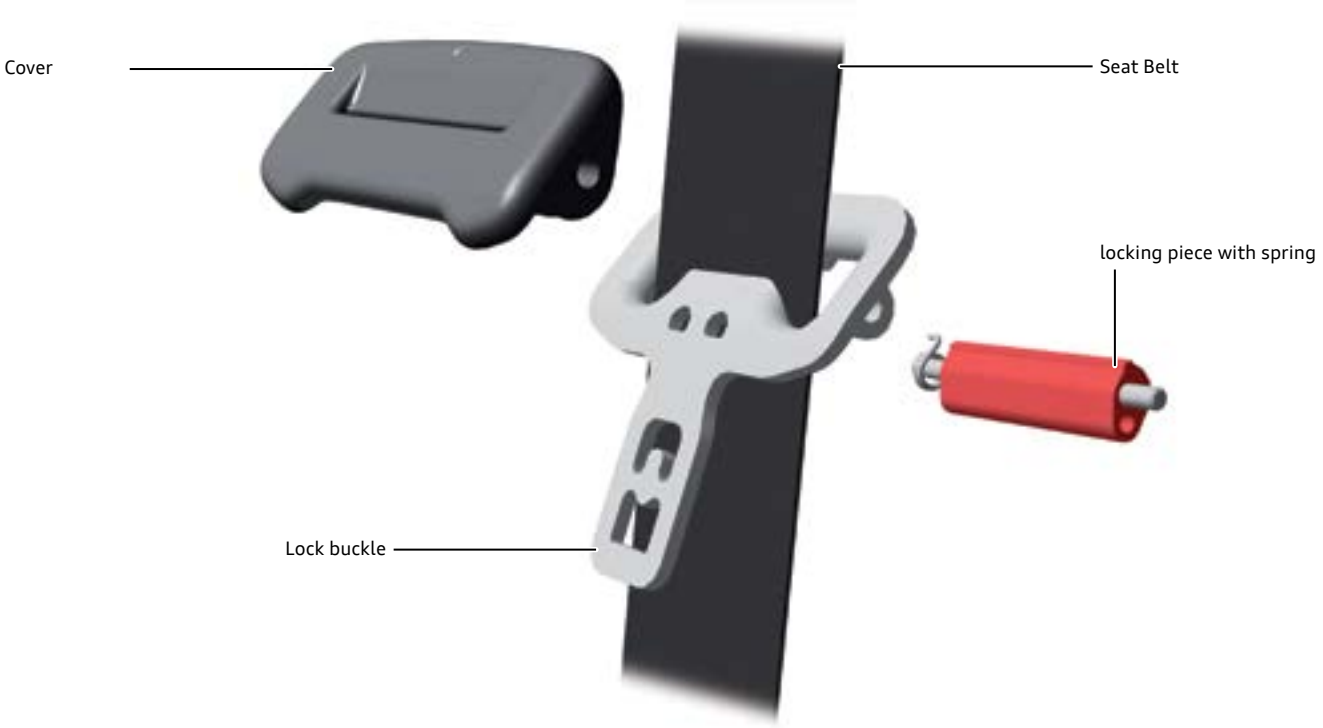
Note

The Pelvic belt tensioner is a pyrotechnic device. Always follow all safety Warnings and Cautions as outlined in the repair literature when working on or near these components.

Design and operation

The locking buckle has a movable spring loaded piece that allows the safety belt to move freely under normal operating conditions.

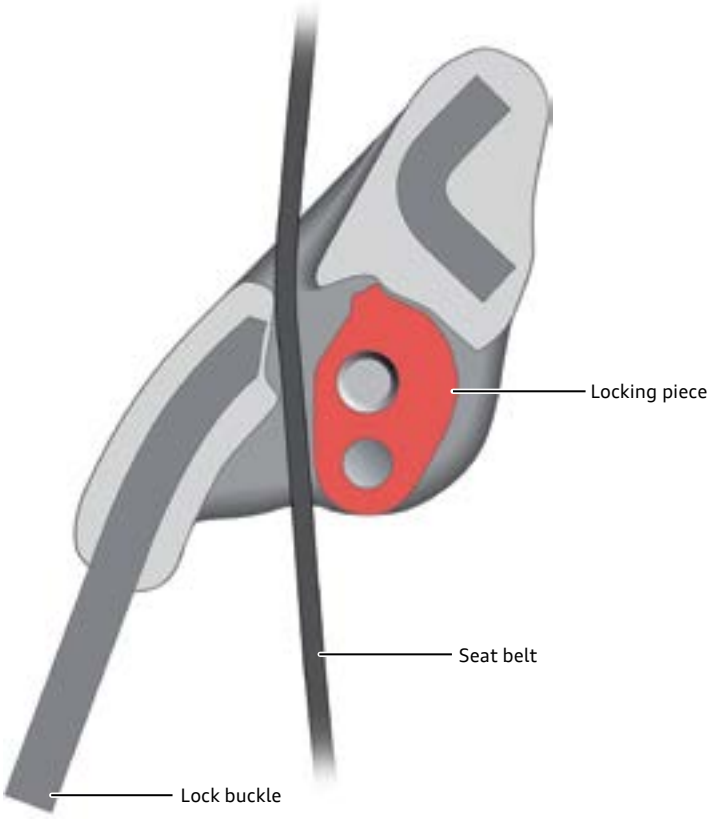
During an accident in which the Pelvic belt tensioner has be triggered, the locking piece is displaced and blocks the safety belt from moving.



625_066

Function

Not blocked



625_067

Blocked

625_068

Reference

For information on removing and installing the lap belt tensioner please refer to the current repair literature and Guided Fault Finding using the VAS Scan Tool.

Active Safety

Audi pre sense

Audi pre sense is able to detect critical driving situations, and initiate measures to prepare the vehicle and occupants for an impending collision.

This is made possible by networking various in-vehicle systems. The systems send data continuously to the data bus. Other control modules are able to evaluate this information and take appropriate action.

Please note that Audi pre sense cannot prevent collisions. It serves only to assist the driver and potentially reduce the severity of the collision.

Audi pre sense basic

Longitudinal dynamics function

When vehicle is moving forward at a speed greater than 18.6 mph (30 km/h) and the driver executes a “hazard braking maneuver” in which the brake pressure reaches a defined level, the reversible safety belt tensioners are partially tensioned.

If the ESP is set to “Sport” or “OFF” using either ASR/ESP Button E256, Driving Profile Selection Switch Module E592 or if the Audi drive select is set to “dynamic” via the MMI, the safety belts will not be partially tensioned.

609_075

609_076a

Emergency braking function

During an “emergency braking” maneuver in which the brake pressure exceeds a defined value for a defined period of time, the reversible safety belt tensioners are fully tensioned by the electric motors.

In this scenario, Airbag Control Module J234 evaluates the signals sent on the data bus from ABS/ESP Control Module J104.

J234 then instructs Seat Belt Tensioner Control Modules J854 and J855 to fully tension the safety belts. Depending on the situation, J104 can also activate the hazard warning flashers.

Transverse dynamics function

If the vehicle oversteers or understeers, the ESP system tries to stabilize it. If the vehicle becomes unstable because certain physical limits have been exceeded, Airbag Control Module J324 initiates a partial tensioning of the electrically reversible safety belt tensioners.

If the vehicle can no longer be stabilized, the safety belt tensioners are fully tensioned.

At the same time, the side windows and the tilt/slide sunroof (if installed) begin to close.

- If ESP is set to "Sport" or "Off" or if Audi drive select is set to "dynamic", the safety belts are **not** partially tensioned.
- If ESP is set to "Sport" mode or "Off", the safety belts are fully tensioned only if the driver actively applies the brakes.

Crash function in the low speed range

If the Airbag Control Module J234 detects a head-on collision with low vehicle deceleration (no airbag deployment), it decides whether or not to fully tension the safety belts based on a situation-specific control module algorithm.

It does not take any other precautions, such as turning on the hazard warning flashers, or closing a window or sunroof.

System characteristics of Audi pre sense basic:

- If a safety belt is not being worn or if the passenger airbag is set to "Off", the reversible safety belt tensioner is not activated.
- The belt tensioner control modules (J854 and J855 respectively) are connected to Airbag Control Module J234 as LIN control modules.
- The forward displacement of the front occupants can be reduced by more than 3.9 in (100 mm) by tensioning the safety belts.

Audi pre sense front

Audi pre sense front is optional and is offered only when the vehicle is equipped with Adaptive cruise control.

Distance Regulation Control Module J428 monitors the traffic in its path and continuously measures the distance between itself and a vehicle driving ahead.

J428 evaluates relevant data from other control modules and transfers signals to the data bus. The ACC control module uses these signals to initiate various actions between ABS/ESP Control Module J104 and Instrument Cluster Control Module J285 as necessary.

Audi pre sense front is active even if the ACC system is not activated. It has the following functions:

A Providing driver warning information when following a vehicle ahead at a critical distance in certain situations.

B In the event of an impending collision with a moving or stopped vehicle, the driver is warned and assistance is provided by automatic braking or by increasing the braking force applied by the driver, which reduces reaction time and vehicle speed.

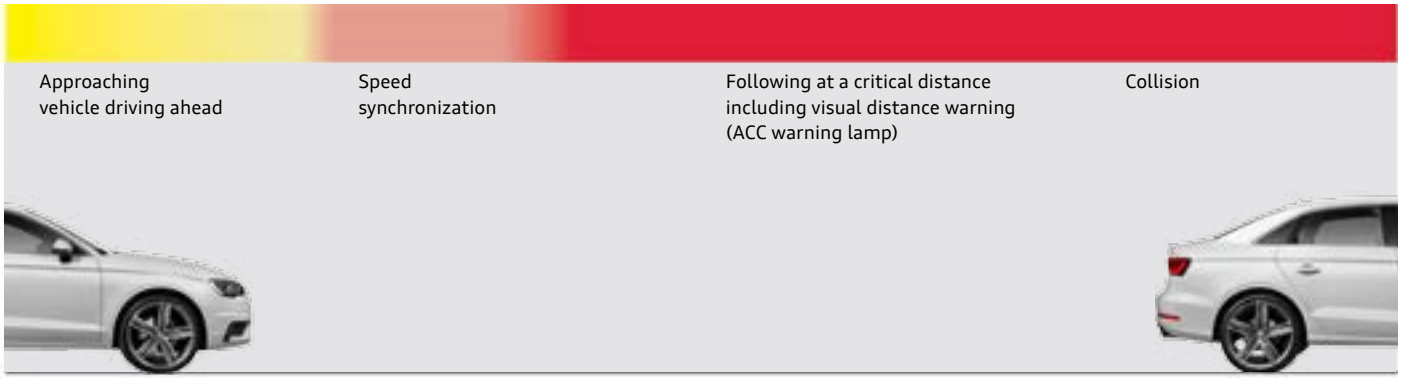
C Full deceleration is provided in the event of an impending collision with a moving, stopped or stationary vehicle at a speed of less than 18.6 mph (30 km/h).

625_054

Function A

The driver is warned visually by a message in the Driver Information System when approaching another vehicle ahead or when following this vehicle at a critical distance at a synchronized speed.

The critical distance is defined as the distance at which a collision is likely to occur in the event of sudden heavy braking of a vehicle driving ahead, even if the driver of the following vehicle reacts quickly.



609_061

Function B

When the vehicle approaches a moving vehicle, Instrument Cluster Control Module J285 warns the driver visually and audibly if certain defined limits are exceeded. These warnings are issued within a certain period of time prior to the last braking opportunity for collision avoidance before the actual collision.

The timing of warnings depends on the driver's degree of activity. Depending on steering, pedal and turn signal inputs, the system classifies the driver as active or inactive and, consequently, as attentive or inattentive. If the driver is attentive, the warning will be issued later than for an inattentive driver.

At the same time, ABS/ESP Control Module J104 prefills the brake system and modifies the deployment algorithms for Hydraulic Brake Assist. This means that Hydraulic Brake Assist begins to build up brake pressure even at low brake pedal actuation speeds.

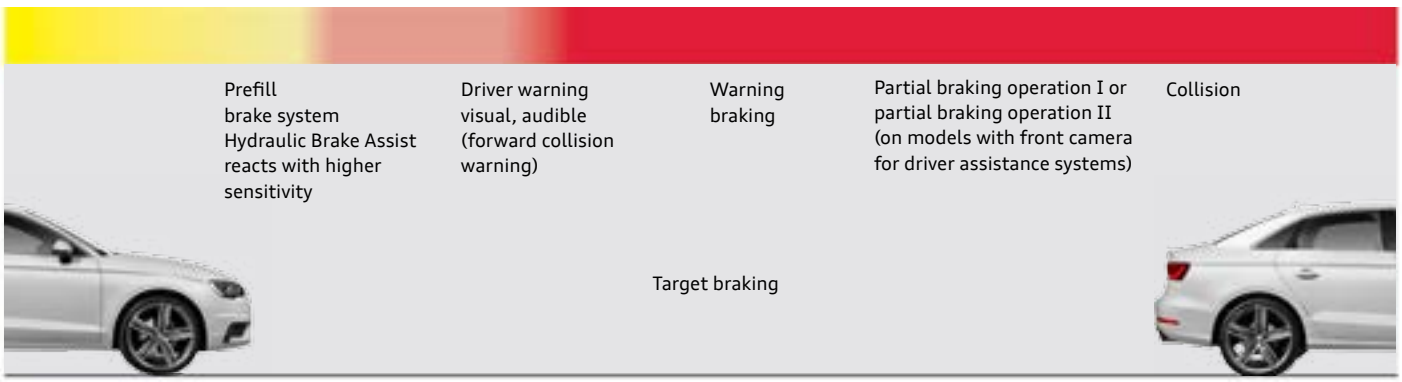
If the driver does not respond to the warnings or, for example, eases off the accelerator, J104 performs a warning braking application.

The warning braking application is a very brief but easily noticeable braking operation and does not serve to slow the vehicle down. It alerts drivers to the traffic situation and indicates to drivers that they must react immediately in order to avoid an impending collision. Depending on how attentive the system evaluates the driver to be, the warning braking application occurs within a specific period of time ahead of the last opportunity for braking and evasive action in order to avoid a collision.

If the driver still fails to react or ease off the accelerator, the vehicle is braked by partial braking operation I, which applies up to 35% of maximum braking force.

If Driver Assistance Systems Front Camera R242 also detects the obstacle, the braking force is increased to up to 60% of the maximum by partial braking operation II.

If the driver applies the brakes, a target braking action can be performed in all phases described above (prefill brake system, reconfiguration of Hydraulic Brake Assist, driver warning, warning braking application, partial braking operations I and II). During the target braking action, the Audi pre sense front system calculates whether the driver is applying sufficient braking force to be able to avoid a collision. If this is not the case, the required brake pressure is increased depending on the situation.



609_063

Function C

Audi pre sense front also includes a function for “full deceleration at speeds from 18.6 mph (30 km/h).”

If Distance Regulation Control Module J428 detects an impending collision when the vehicle is travelling at a speed of less than 18.6 mph (30 km/h), ABS/ESP Control Module J104 pre-fills the brake system.

The deployment algorithms for Hydraulic Brake Assist are adjusted at the same time. Hydraulic Brake Assist thus begins to build up brake pressure even at low brake pedal actuation speeds. If the driver fails to brake or does not apply sufficient braking force in a critical situation, J104 executes a braking action and applies near-maximum braking if necessary.

Before the braking action occurs, the driver is alerted both audibly and visually through the DIS that the vehicle is about to brake independently or provide additional braking force.

If the vehicle has independently braked to a standstill without driver intervention, three more audible signals are given.

The three additional signals given alerts the drivers that they must actively take control over the vehicle by applying the brake. If the driver fails to take control (especially in a vehicle equipped with an automatic transmission) the vehicle will begin to roll.

609_064

System characteristics with respect to "full deceleration at speed of less than 18.4 mph (30 km/h)"

- The driver is not given advance warning.
- The system reacts to crossing or oncoming vehicles and objects with low radar scatter (for example, pedestrians).
- The system reacts to vehicles which are travelling in the same direction, have stopped or are stationary.

Driver prioritization over system

If the driver clearly takes evasive action, accelerates or brakes during the individual phases of Audi pre sense front (functions A to C), the action momentarily being taken by Audi pre sense front (for example, partial braking operation I) will be suppressed or cancelled.

If the obstacle is no longer relevant after evasive action has been taken, Audi pre sense front will cease to provide assistance in this case.

There are two options for deactivating Audi pre sense front in the MMI.

- Option 1: Prewarning off – the audible and visual warnings (distance and forward collision warnings) are deactivated.
- Option 2: System off – the audible and visual warnings (distance and forward collision warnings), warning braking, partial and target braking and the "full deceleration at speeds of below 18.4 mph (30 km/h)" functions are deactivated. The functions remain deactivated until they are reactivated in the MMI.

Both versions of Audi pre sense are activated. *609_078a*

If only the pre-warning has been deactivated, no text message is displayed in the DIS.

If the system has been deactivated, the driver is warned by a text message in the DIS - Audi pre sense off - whenever the ignition is switched on. This alerts the driver to the fact that the system is switched off.

609_079a

If the ESP is set to “Sport” or “OFF” using the ASR/ESP Button E256, then the audible and visual warnings, the warning braking, the partial and target braking, and the "full deceleration at speeds of below 30 kph" functions of Audi pre sense will also be deactivated.

Audi pre sense remains deactivated until:

- ESP is reactivated with E256.
- the ignition is switched off and on again, thereby reactivating ESP.
- ACC is activated, since this would result in automatic activation of ESP.

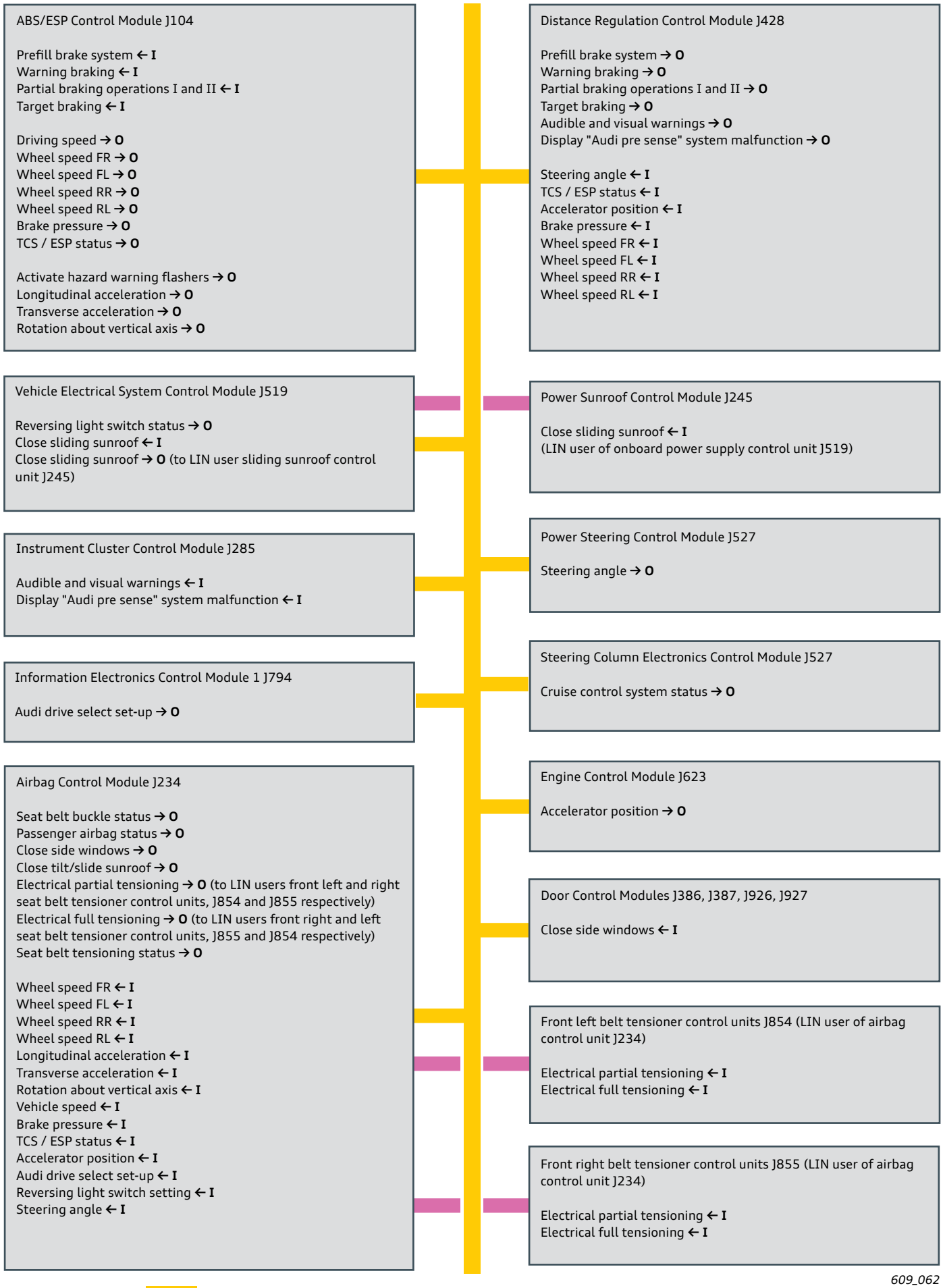
If ESP (Electronic Stabilization Program) is set to "Sport" or "Off" button E256, the following text is temporarily displayed in the DIS: "Audi pre sense: off".

Reference
For additional information about ACC, refer to eSelf-Study Program 960143, *The 2015 Audi A3 Running Gear and Suspension System*.

Reference
For more information about Driver Assistance Systems Front Camera R242, refer to eSelf-Study Program 970343, *The 2015 Audi A3 Vehicle Electronics and Driver Assistance Systems.*

Data bus overview

The overview shows some of the information exchanged via data bus.



609_062

Key:

Data bus in general

LIN bus

← I Data is received (input)

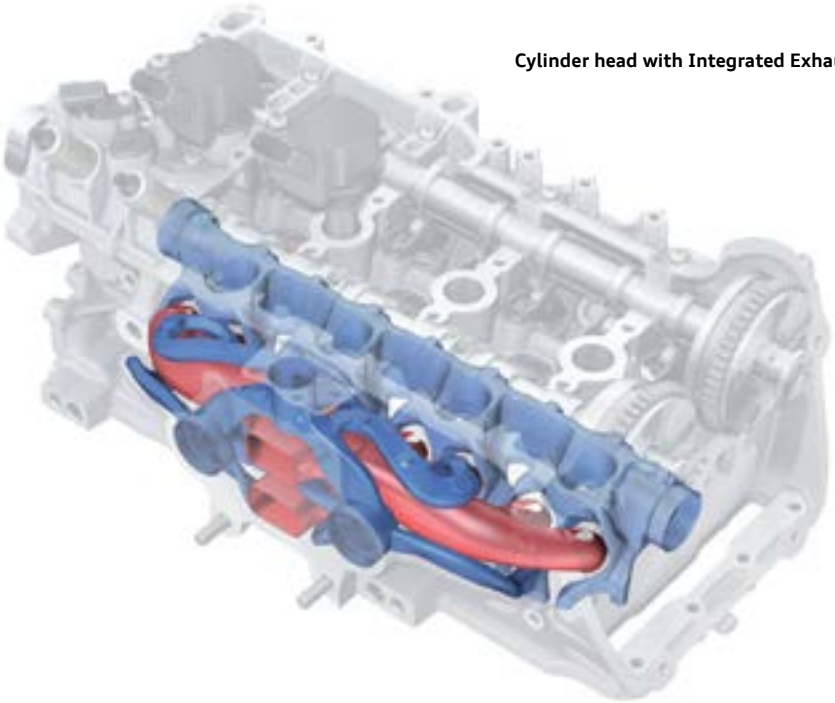
→ O Data is sent (output)

Engines

1.8L and 2.0L TFSI engines

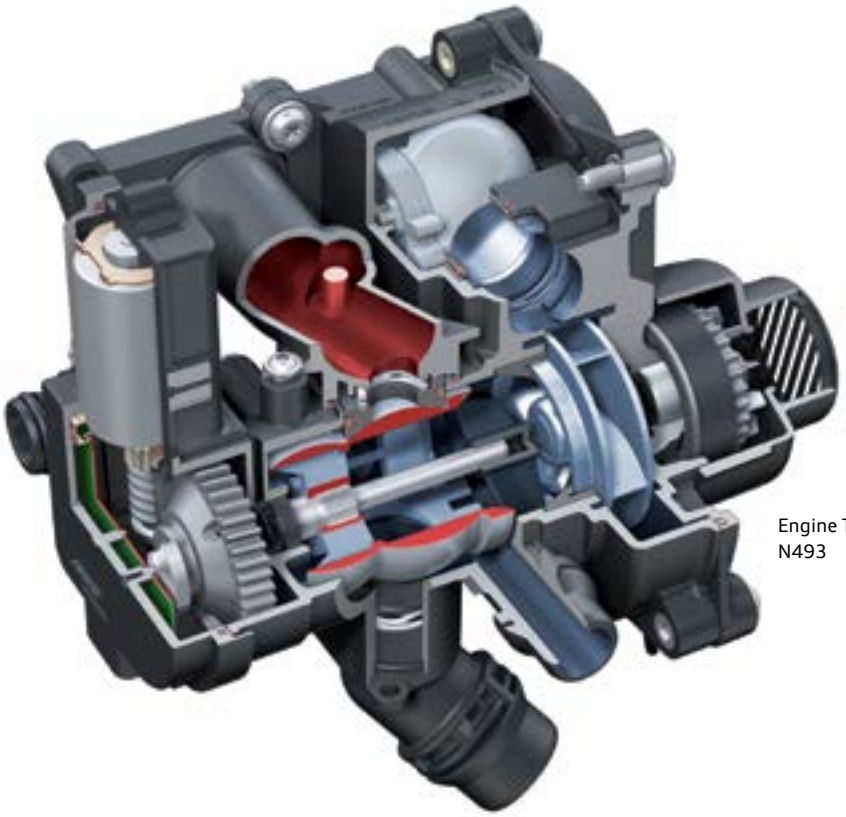
Technical feature overview

Cylinder head with Integrated Exhaust Manifold (IEM)



2.0L TFSI engine shown. The 1.8L TFSI engine does not have continuously adjustable exhaust camshaft timing.

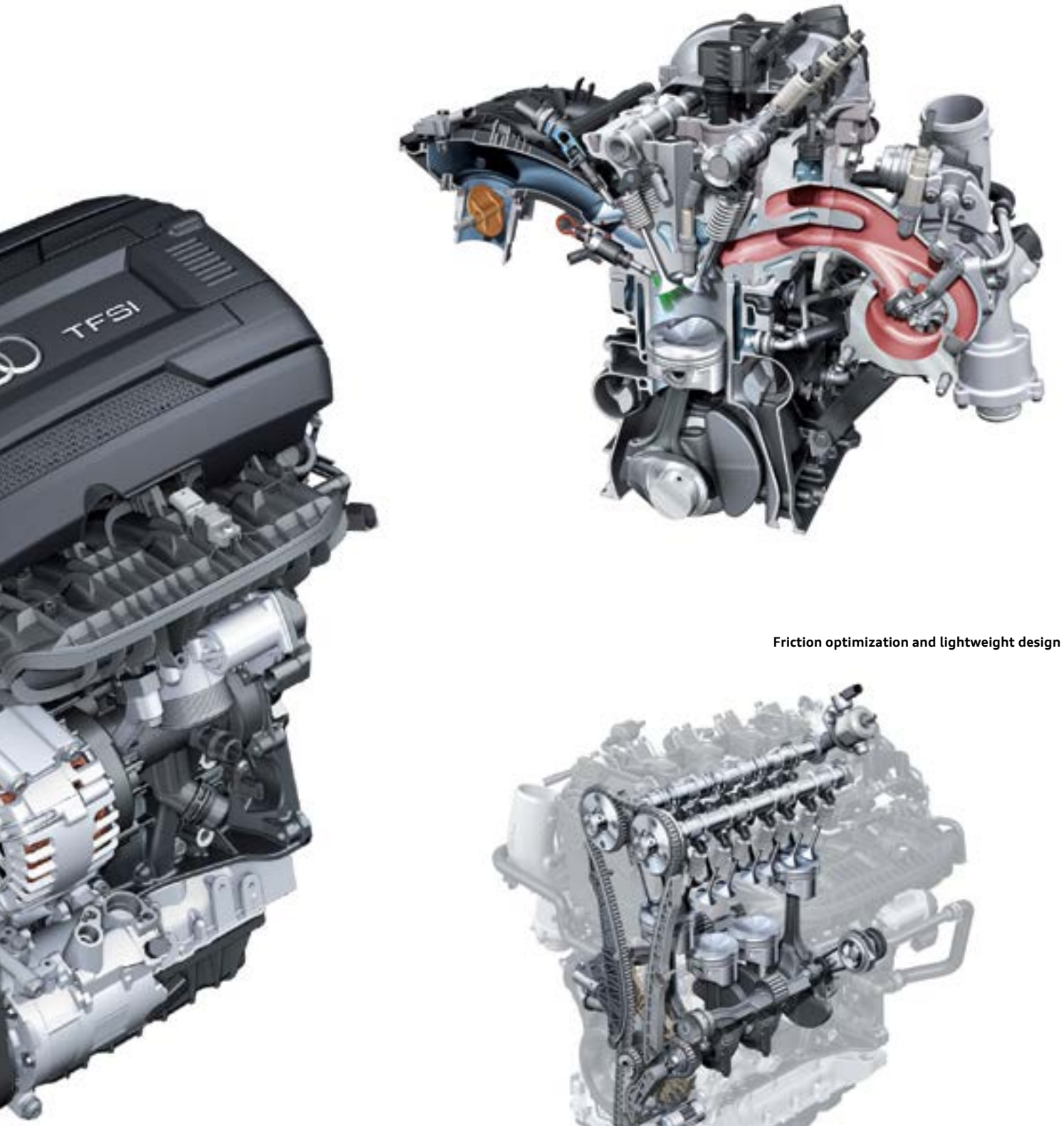
Optimized thermal management



Engine Temperature Control Actuator N493

Both the 1.8L TFSI and 2.0L TFSI engines for the North American market will only have the FSI injection system. The dual injection may be introduced at a later date.

Combined FSI/MPI injection



Friction optimization and lightweight design

609_156

Reference

For detailed information about the 1.8L and 2.0L TFSI engines, please see eSelf-Study Program 920243, *Third generation Audi 1.8L and 2.0L engines from the EA888 model family*.

625_107

Diesel engines

2.0l Second generation TDI engine

Technical features

Cylinder block with integrated balancer shafts

609_041

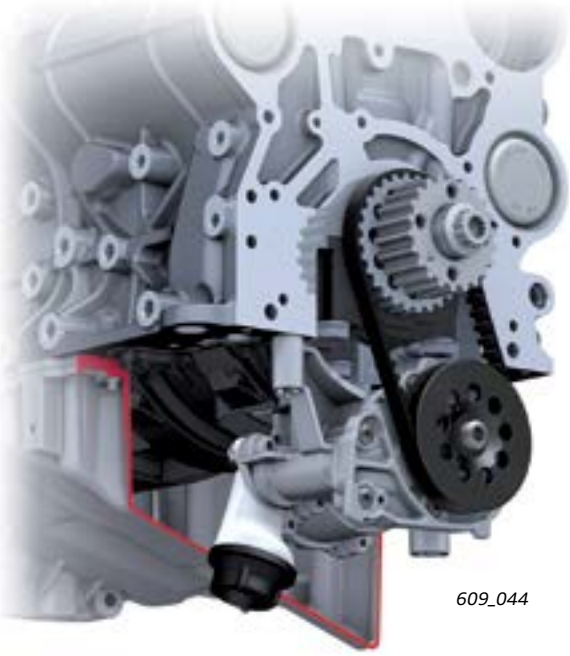
Oxidizing catalytic converter and diesel particulate filter

609_042

Cylinder head with variable valve timing

609_043

Oil pump with integral vacuum pump



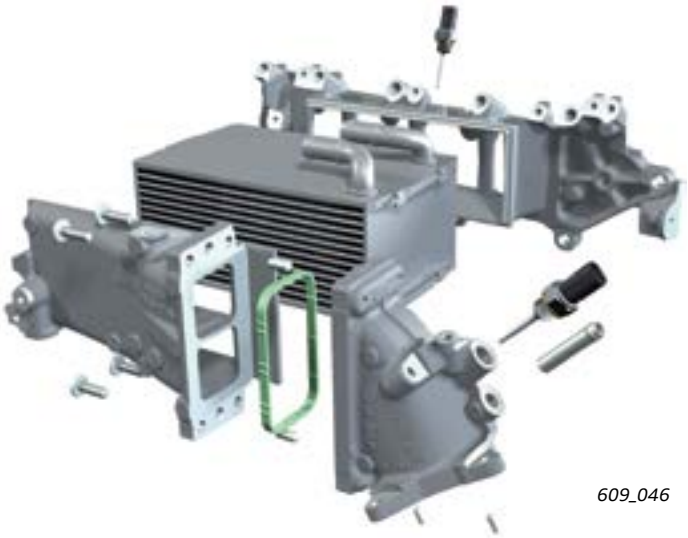
609_044

609_017

Active coolant pump

609_045

Intake manifold module with integrated charge air cooler



609_046

Engine/transmission combinations

1.8l TFSI engine

2.0l TFSI engine

2.0l TDI engine

Transmission designations:

0AH	(MQ200_5F)
0AJ	(MQ200_6F)
02S	(MQ250_6F)
02Q	(MQ350_6F)
0FB	(MQ350_6A)
0CW	(DQ200_7F)
0D9	(DQ250_6A)

Explanation of manufacturer designation:
Example: MQ350-6F

M	Manual transmission
D	Dual clutch transmission
Q	Transverse installation
350	Nominal torque capacity
6	Number of gears
F	Front wheel drive
A	All-wheel drive (quattro)

Notes

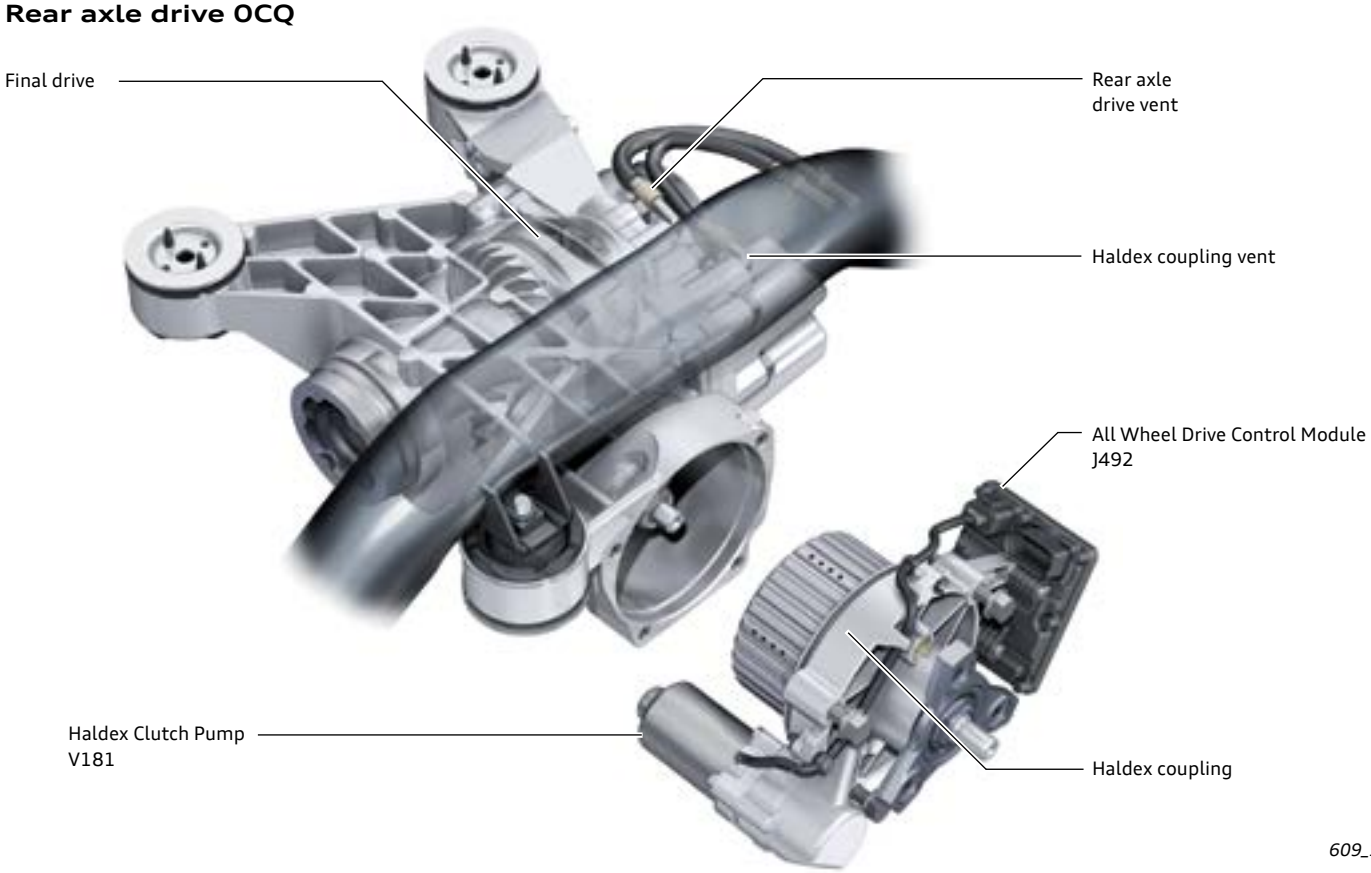
Power transmission

Overview

The drive train components of the 2015 A3 are based on proven technology and include the new 5th generation Haldex coupling on quattro models.

The installation position of the transmission has been adapted to the modular transverse module (MQB) by modifying the transmission flanges and mounting points. The original 6-speed dual clutch transmission 02E is now designated as the 0D9. It's installation is inclined 12 degrees further back than the 02E.

Rear axle drive 0CQ



609_129

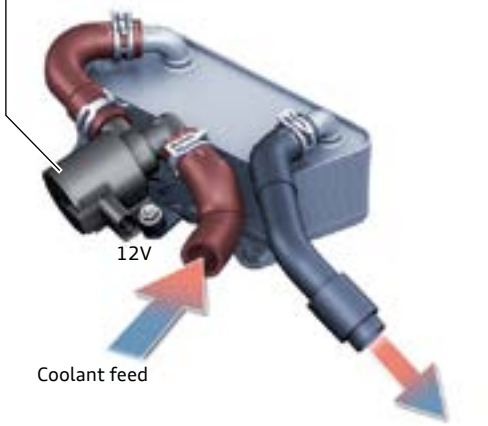
ITM for the 02S and 0D9 transmissions

Both 02S and 0D9 dual clutch transmissions are integrated with the Innovative Thermal Management system for the 2015 A3 model line-up. The 02S is used in the 1.8L A3 Front Track model while the 0D9 is used in the 2.0L quattro model.

The transmission cooling circuit is initially open during the start phase of a cold engine. During this time, Transmission Coolant Valve N488 is energized when the ECM switches the valve to ground. If there is enough heat available for the engine and for heating the passenger compartment, the valve is de-energized. The cooling circuit is now closed and the ATF is heated to operating temperature by the engine coolant. The ATF temperature value is transferred from the transmission to the ECM via the Powertrain CAN bus. If the ATF has reached operating temperature, valve N488 is re-energized and the cooling circuit is open.

If the ATF temperature exceeds a permissible value, N488 is de-energized again. The cooling circuit is closed. Because the engine coolant temperature is kept below the maximum permissible ATF temperature in this case, the ATF is cooled by the engine coolant.

Transmission Coolant Valve N488
- Activated and diagnosed by the ECM
- Energized: valve closed, open coolant circuit
- De-energized: valve open, closed cooling circuit



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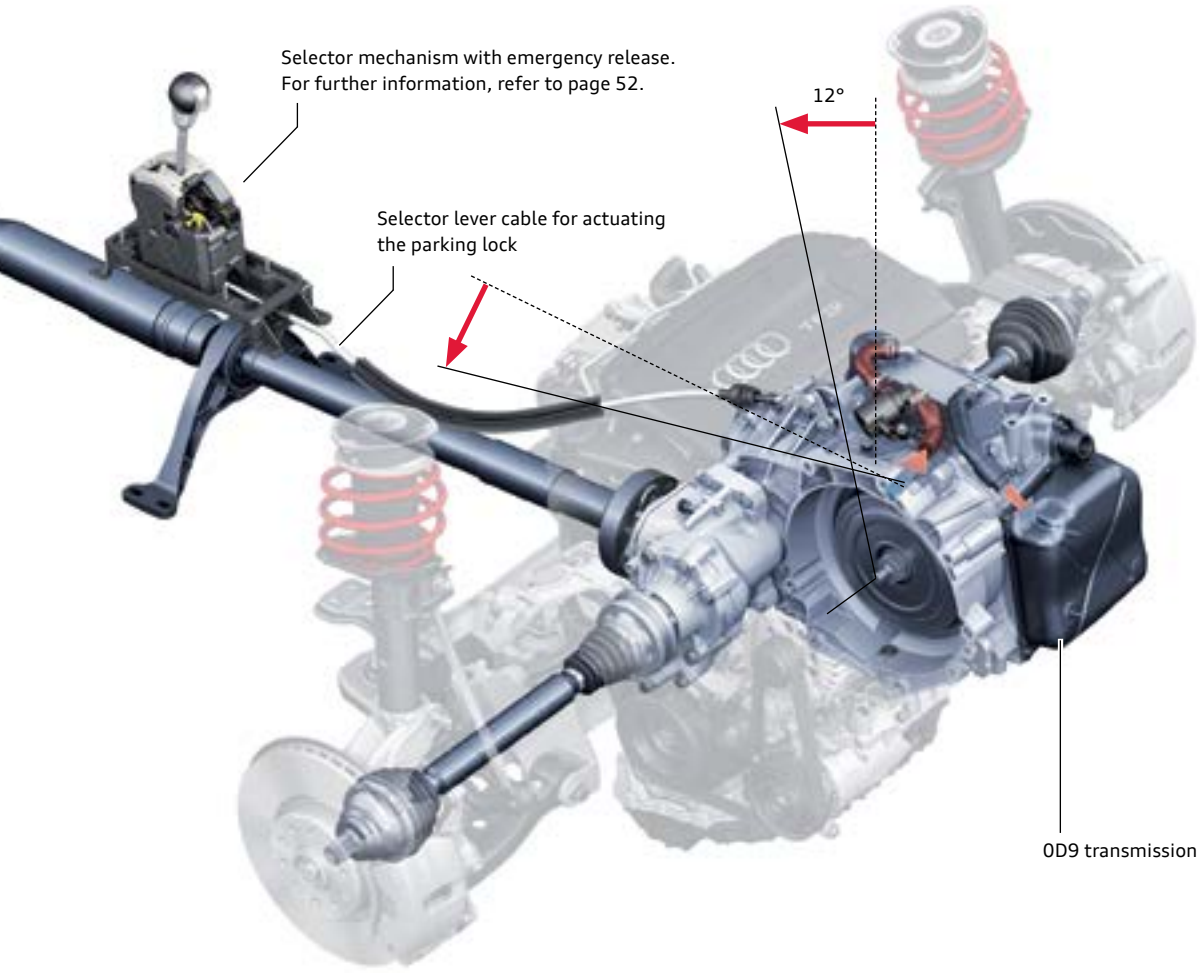


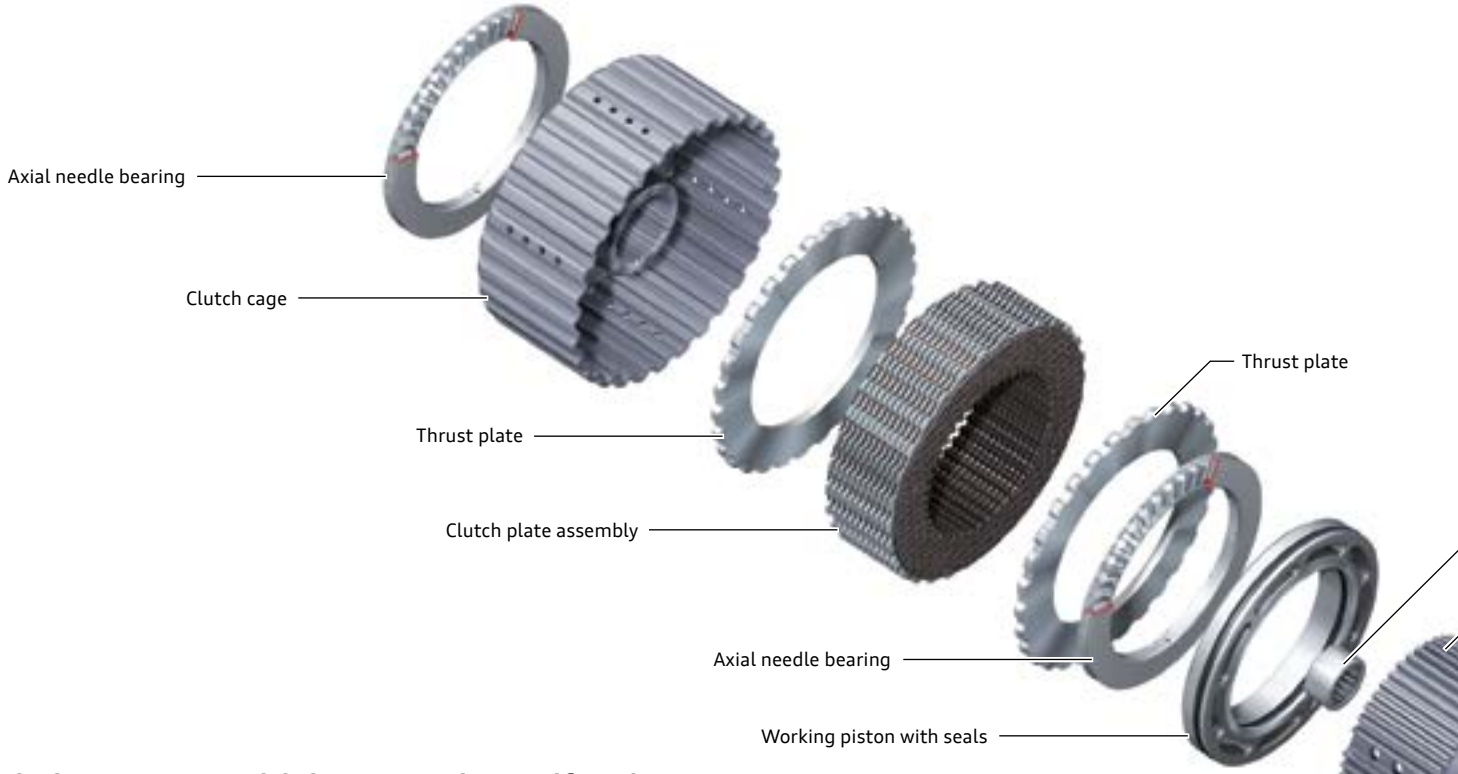
609_131

5th generation Haldex coupling

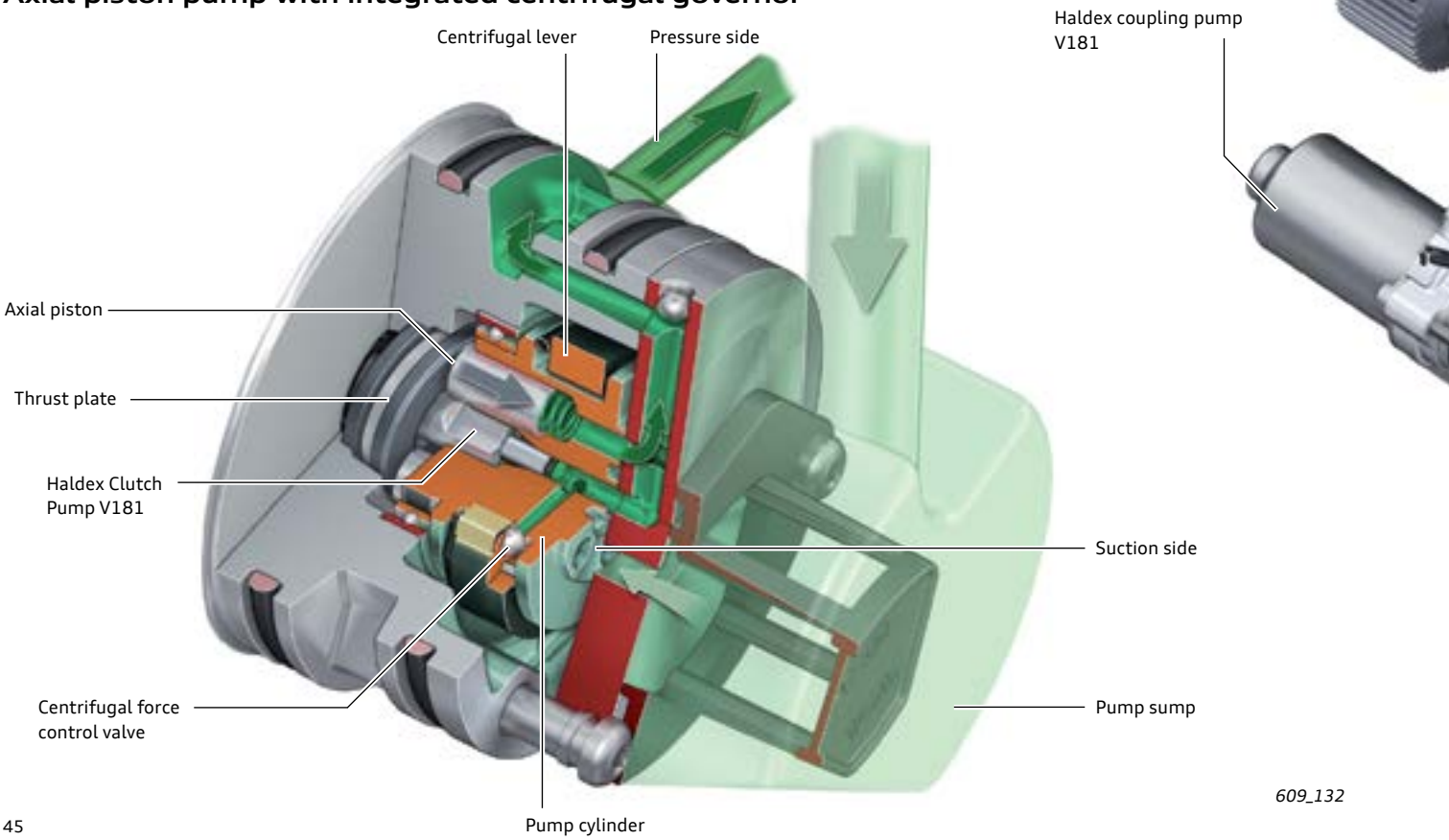
Component overview

The most notable feature of the 5th generation Haldex coupling is a new pressure control system. The hydraulic pressure required for the Haldex coupling is produced by a pump with centrifugal governor. The new Haldex coupling is 3.7 lb (1.7 kg) lighter than the 4th generation coupling.

An electric motor drives a six axial piston pump. The pistons are pushed against an inclined thrust plate. When the pump cylinder rotates, the pistons execute an axial stroke and move the Haldex oil to the pressure side of the pump.



Axial piston pump with integrated centrifugal governor



609_132

All Wheel Drive Control Module J492

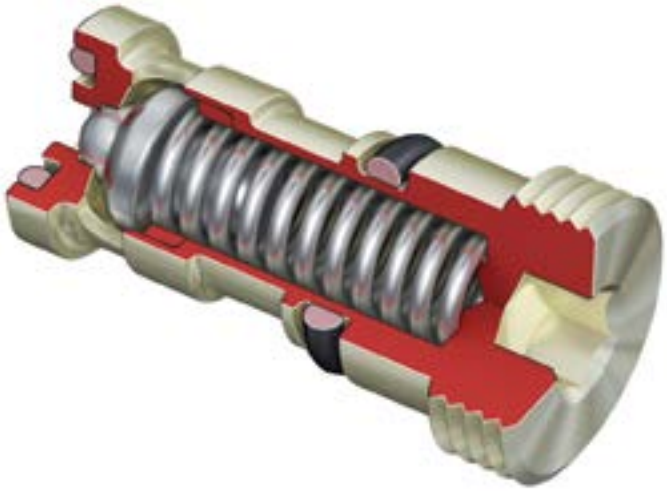
All Wheel Drive Control Module J492 exchanges data over the Suspension CAN bus. Its software determines the pump output based upon programmed characteristic curves, which in turn generates the required hydraulic pressure delivered to the working piston cylinder.

The electric motor of the pump is controlled with a pulse width modulated 12 volts. Current input is also measured.

The hydraulic pressure is determined as a function of current input based on the characteristic curves. If a higher pressure is required, pump output is increased by pulse width modulation of the voltage. To reduce the pressure in the working piston cylinder, pump output is decreased. The system is supplied power via Terminal 30 and is protected by a 15A fuse.

Pressure relief valve

The Haldex unit hydraulic system is protected by a pressure relief valve. It consists of a valve ball and steel spring. If a hydraulic pressure greater than 638.1 psi (44 bar) develops, the spring force is no longer sufficient to hold the valve ball in place. Its movement unblocks the relief port and the Haldex oil is displaced to the suction side of the axial piston pump.



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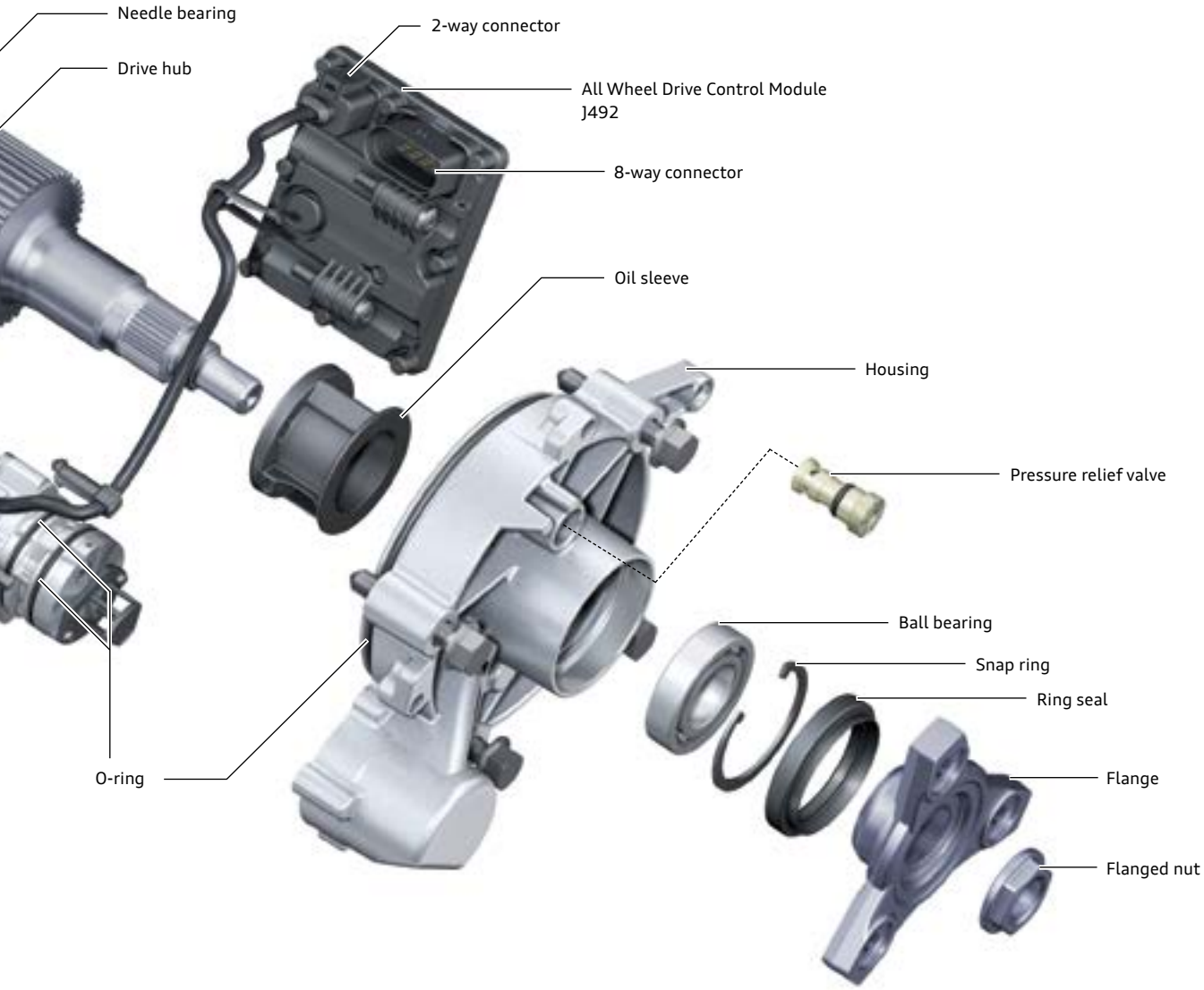


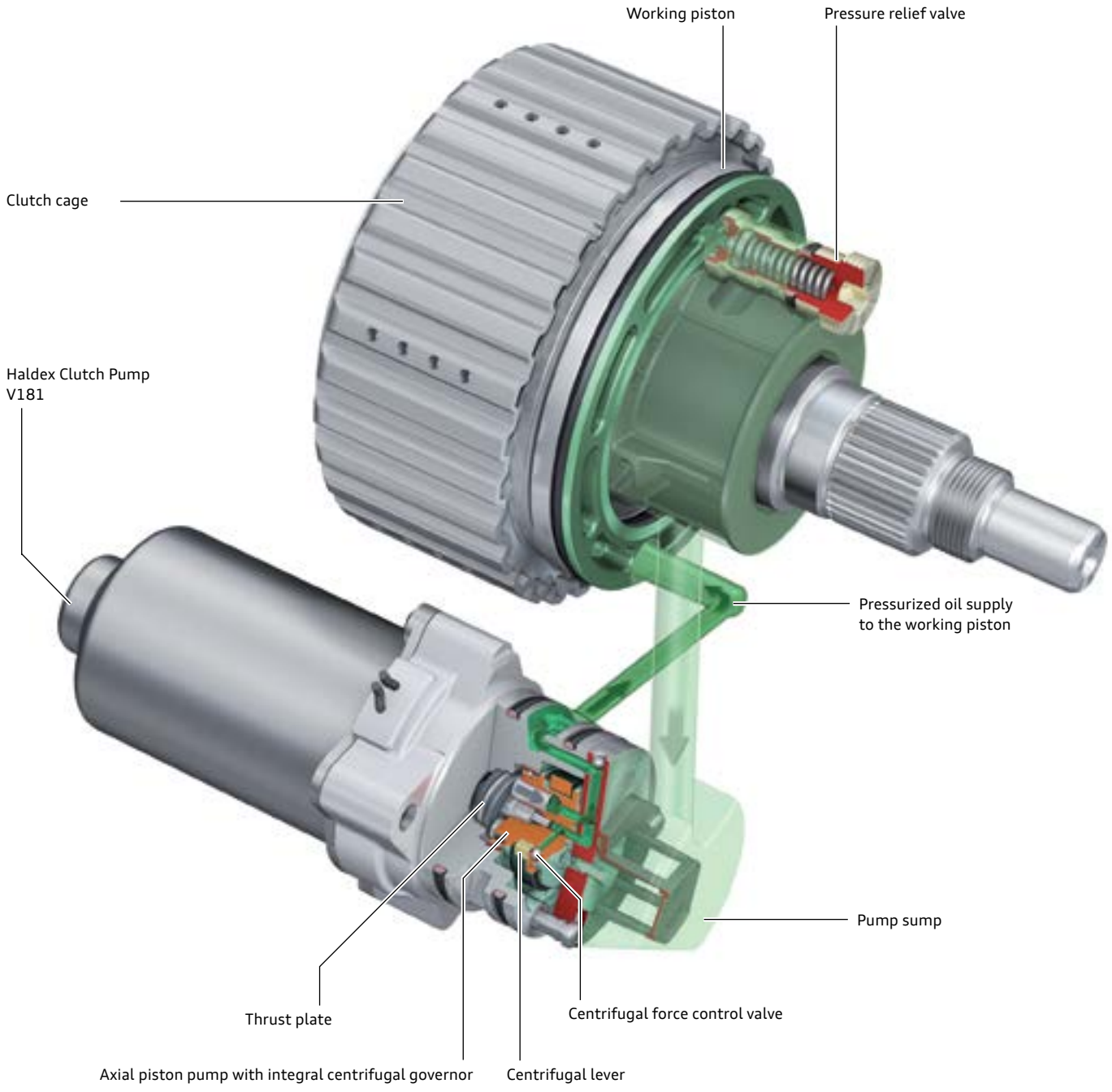
609_134

Oil supply / hydraulic diagram

The axial piston pump with an integrated centrifugal governor is driven by Haldex Clutch Pump V181. The centrifugal force acting on the centrifugal levers of the controller increases with axial piston pump speed. The valve balls of the centrifugal force control valves are pushed down into the valve seat more firmly. This increases the pressure maintained by the valves. This design allows the system to achieve outstanding pressure increase and pressure reduction times.

The hydraulic pressure supplied to the working piston is controlled by varying the speed of Haldex Clutch Pump V181. When the speed of V181 increases, the pressure to the working piston increases. This in turn increases pressure to the clutch plate assembly allowing more torque to be transmitted.

If the speed of V181 decreases, there is less pressure supplied to the working piston and less torque can be transmitted.

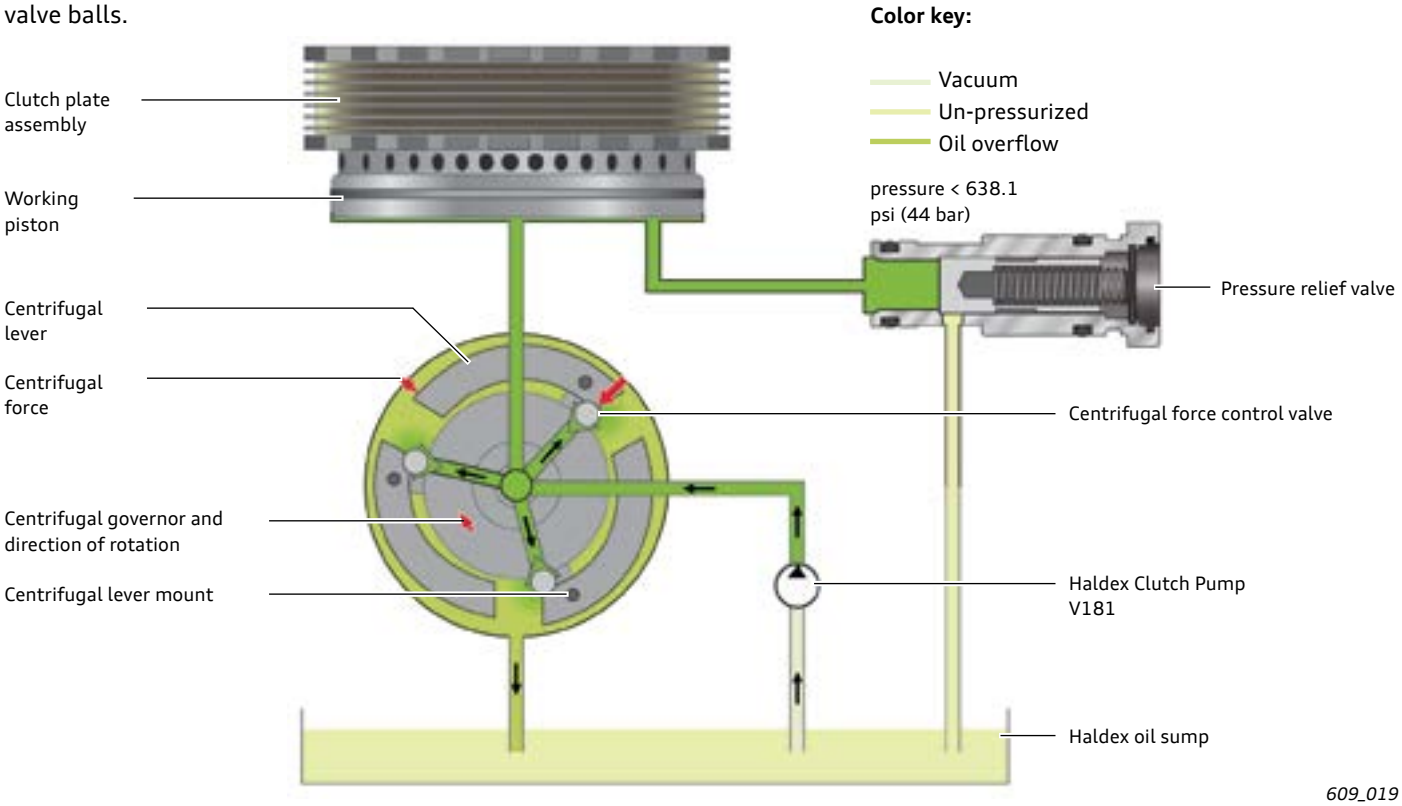


609_135

Operation - low pump motor speed

At low speeds, there is no pressure build-up inside the working piston cylinder. Due to the low speed of the pump motor, the centrifugal levers do not apply pressure to the valve balls.

The pumped oil flows back into the sump through the centrifugal force control valves of the centrifugal governor.

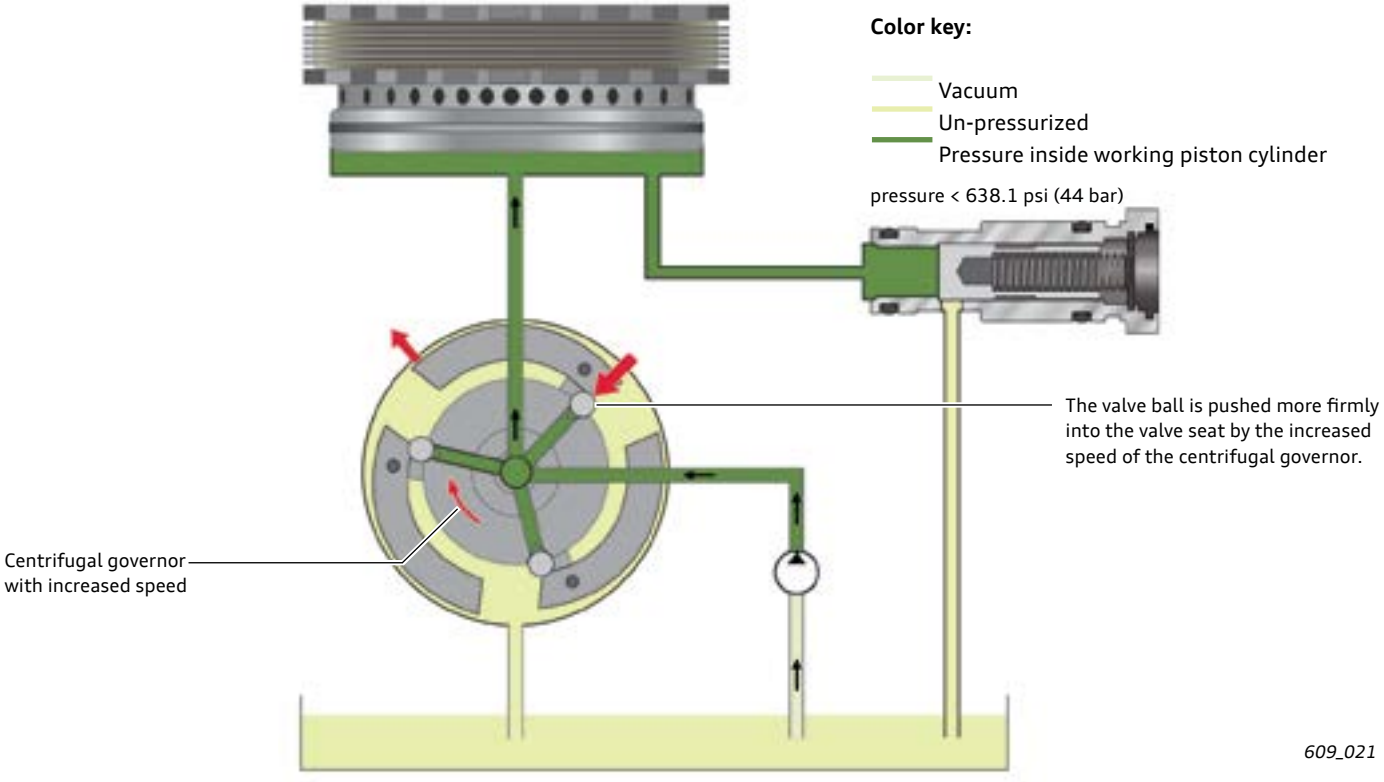


609_019

Pressure build-up due to increased pump motor speed

As the pump motor speed increases, pressure builds up inside the cylinder of the working piston. The centrifugal levers now apply pressure to the valve balls and close the gap. The rising pressure pushes the valve balls back slightly, bringing the centrifugal force and the hydraulic force into equilibrium.

The pressure inside the working piston, and therefore, the amount of torque which can be transmitted, rises with increasing motor speed.

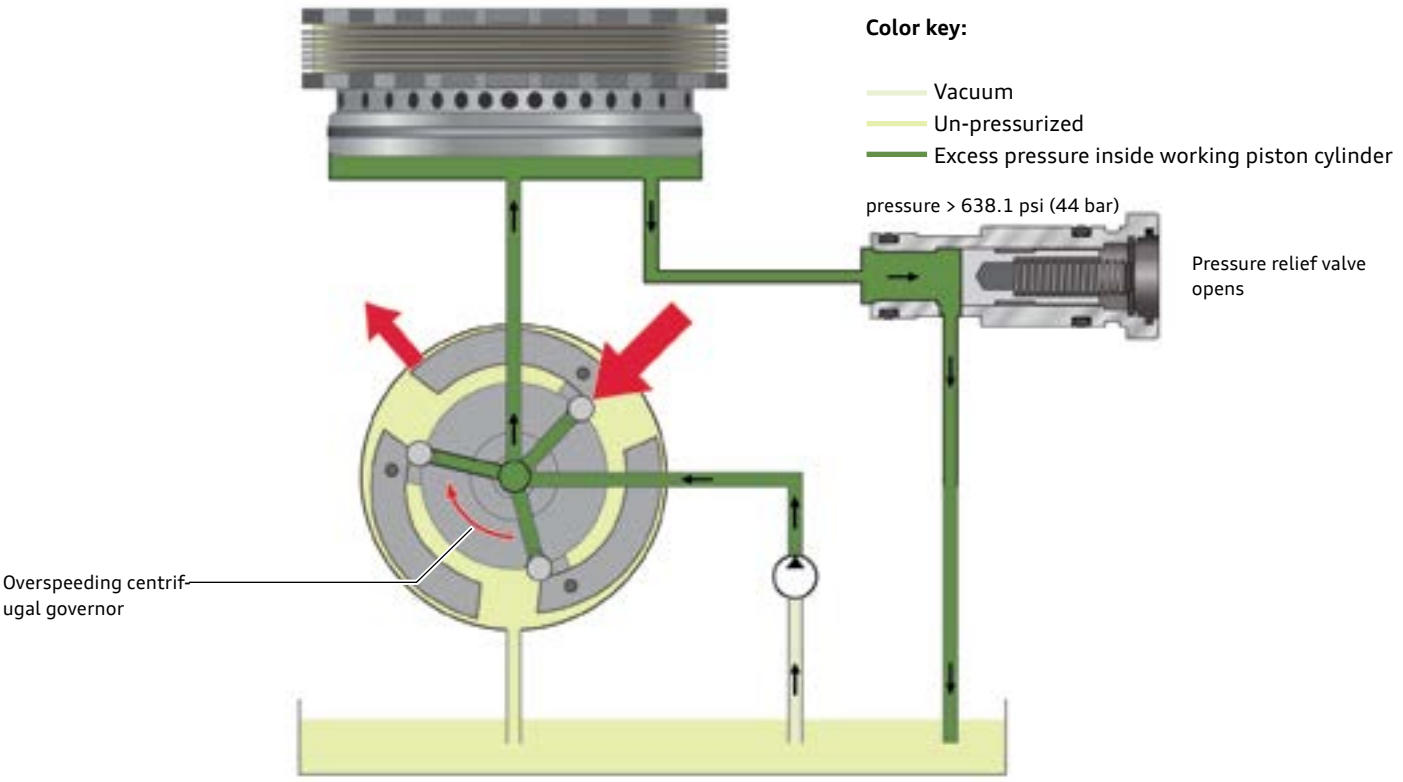


609_021

Operation - extremely high pump motor speed

At high pump motor speeds, centrifugal levers apply pressure to the valve balls to such an extent that the pressure inside the working piston cylinder rises to an unacceptable level.

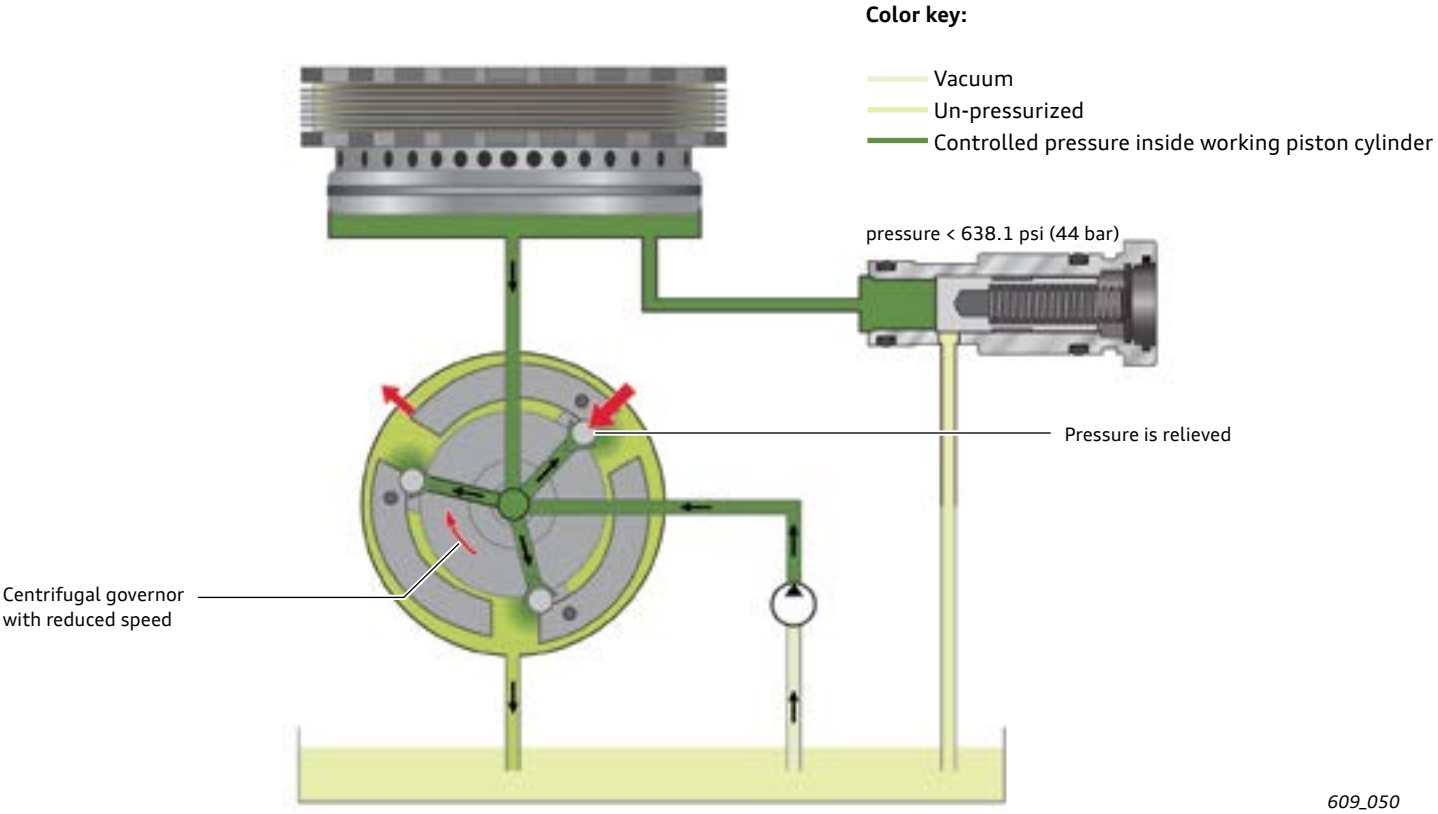
When the pressure exceeds 638.1 psi (44 bar), the pressure relief valve opens and limits the system pressure.



609_020

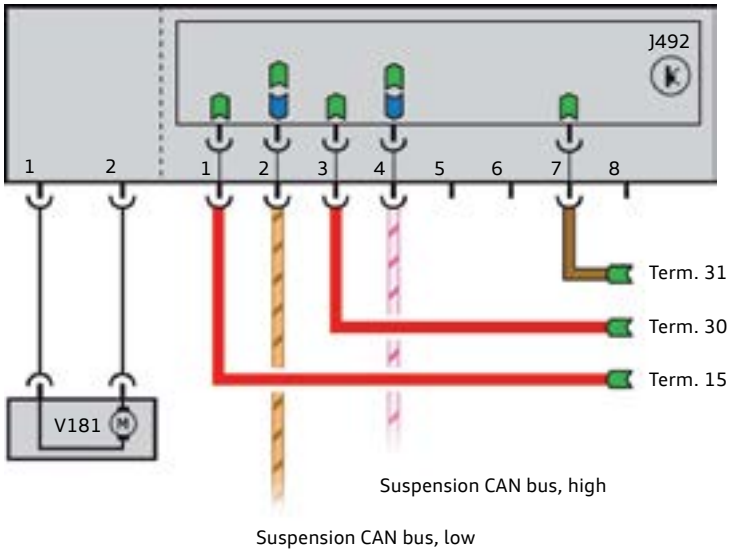
Pressure reduction due to decreased pump motor speed

When the pump motor speed slows, the centrifugal levers exert less pressure on the valve balls. The pressure is relieved through the open valve gap until the centrifugal force and the hydraulic force are equal.



609_050

Function diagram



J492: All Wheel Drive Control Module
V181: Haldex Clutch Pump

609_136

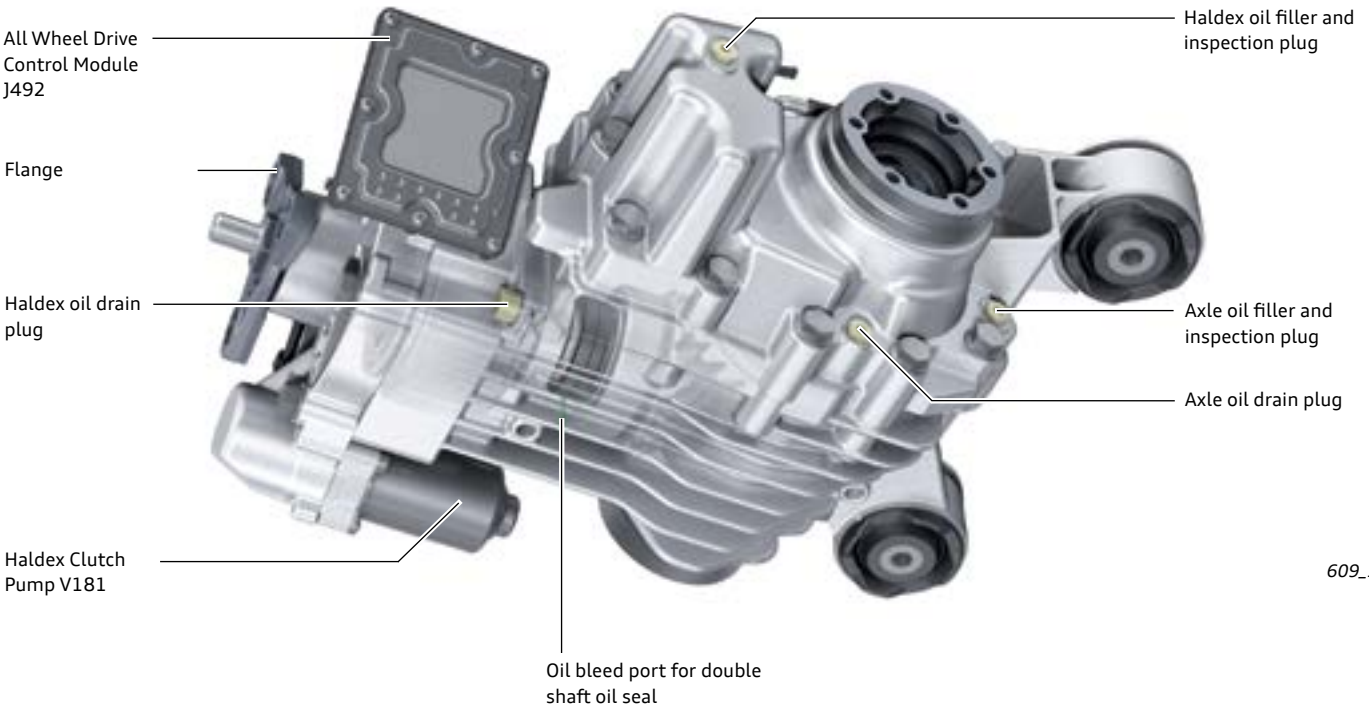
All Wheel Drive Control Module J492 communicates with ABS/ESP Control Module J104 and Power Steering Control Module J500 over the Suspension CAN bus.

It communicates with DSG Transmission Mechatronic J743, Instrument Cluster Control Module J285, and Engine Control Module J623 via Data Bus On Board Diagnostic Interface J533.

Service

All Wheel Drive Control Module J492, Haldex Clutch Pump V181 and flange for the propeller shaft are replaceable.

Various seals for the housing are also replaceable. Please refer to the current repair literature for the latest information.



609_137

Change intervals

The Haldex oil must be changed every 3 years, regardless of mileage. The axle oil is not subject to a change interval.

Note
Haldex oil and rear axle oil are NOT the same. Do not mix them up during service work or irreparable damage to components will occur.

Diagnostics

All Wheel Drive Control Module J492 can be accessed with the VAS Scan Tool via Address Word 22.

The following functions are available:

- **Control module identification**
- **Specified/actual comparison**
  The validity of the software, the coding and the adaptation channels for the vehicle is checked.
- **Check DTC memory**
  Query and erase.
- **Output check diagnosis**
  To activate the output check diagnostics, the engine must be running the coolant temperature less than 140 °F (60 °C).

  If the output check diagnostic is operating, the multi-plate clutch is kept closed up to a speed of 4 mph (6 km/h). The vehicle must be driven below this speed with the steering wheel at full lock (left or right). This places a strain on the drive line causing the rear axle to shudder. When the driven speed reaches 4 mph (6 km/h), the clutch opens and the strain on the drive line is relieved. This is an indication that the Haldex coupling is working.
- **Basic setting**
  The basic setting function can be used to assign Haldex Clutch Pump V181 to a matching characteristic curve stored in All Wheel Drive Control Module J492.
- **Read MVBs**
- **Replace control module**
  Includes all the work operations necessary to replace the control module.

Replacing Haldex Clutch Pump V181

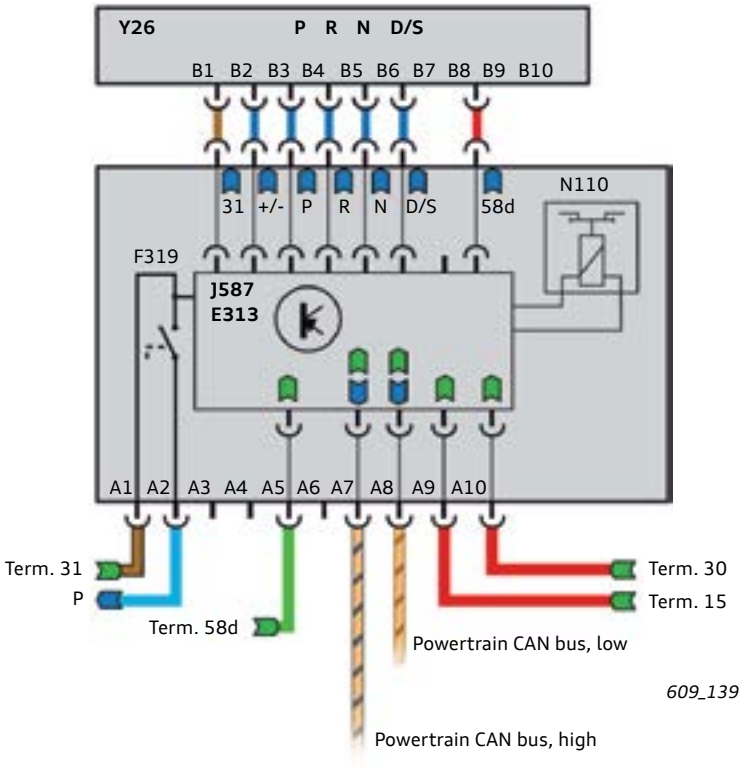
After replacing Haldex Clutch Pump V181, the first thing to do is to correct the Haldex oil level. Next, an output check diagnosis must be done on the vehicle while it is stationary and then the oil level checked again. Finally, the basic setting procedure must be performed.

Emergency running mode

Two temperature sensors are mounted on the printed circuit board of control module J492 which monitor the electronic components. The temperature of the multi-plate clutches is calculated based on these temperature values. If the calculated temperature exceeds a specific threshold, the Haldex coupling is shut off. No indication or warning is given to the driver.

Transmission selector mechanism

609_138



609_139

Selector Lever Transmission Range Position Display Unit Y26

Selector lever position

If the selector lever is in P, switch F319 is open. It is closed in all other positions. The information "selector lever in P", "switch F319 open" cancels the ignition key removal lock and is required to enable engine starting. If there is a short circuit to ground in the circuit, the engine cannot be started and the ignition key cannot be removed in models without Advanced key.

Selector lever positions P, R, N, D/S and the tiptronic signals “tiptronic gate recognition”, “tip plus” and “tip minus” are recognized by Selector Lever Sensor System Control Module J587 and sent to DSG Transmission Mechatronic J743 via the Powertrain CAN bus.

To shift from D to S (or S to D), the lever needs only to be flicked backwards out of D/S once. The lever always springs back to the D/S position.

E313 Selector Lever

F319 Selector Lever Park Position Lock Switch

J587 Selector Lever Sensor System Control Module

N110 Shift Lock Solenoid

Y26 Selector Lever Transmission Range Position Display Unit

P A discrete wire to Steering Column Electronics Control Module J527 in vehicles without Advanced key and to Electronic Steering Column Lock Control Module J764 in vehicle with Advance key.

Parking lock emergency release mechanism

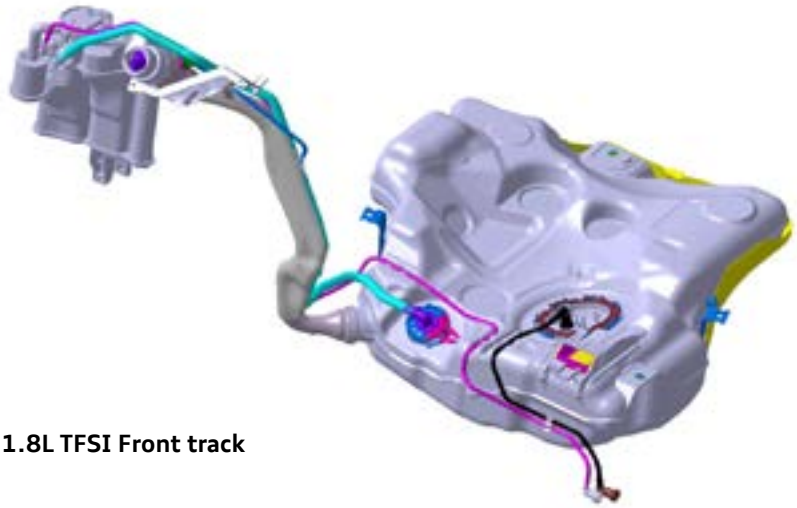
The parking lock emergency release mechanism can be accessed by unclipping the selector lever gate from the center console and pushing the insulating foam to the side.

609_140

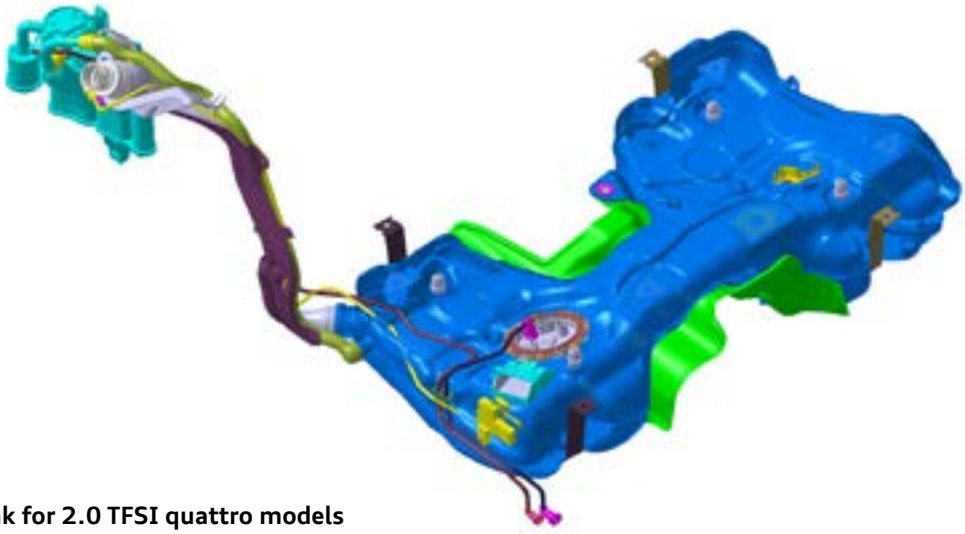
Fuel tanks

Various fuel systems are used in the Audi A3 ’13. Various factors dictate which system is fitted in the vehicle:

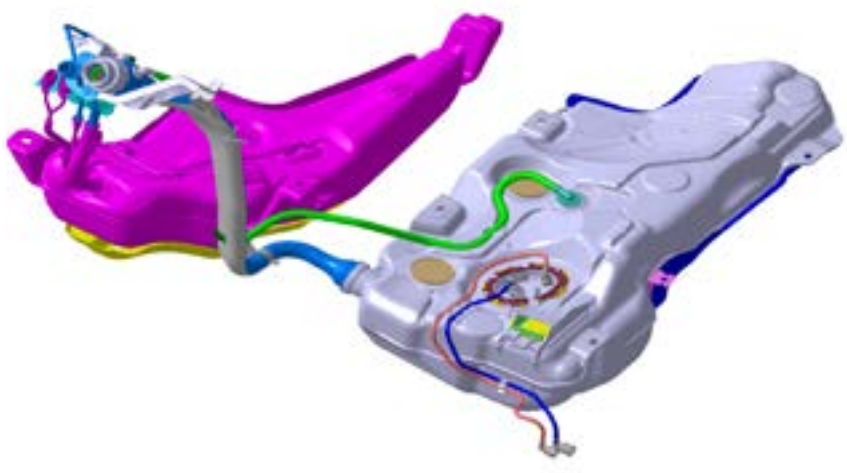
- Engine type
- quattro or front wheel drive
- Climate zone of market



Fuel tank for 1.8L TFSI Front track



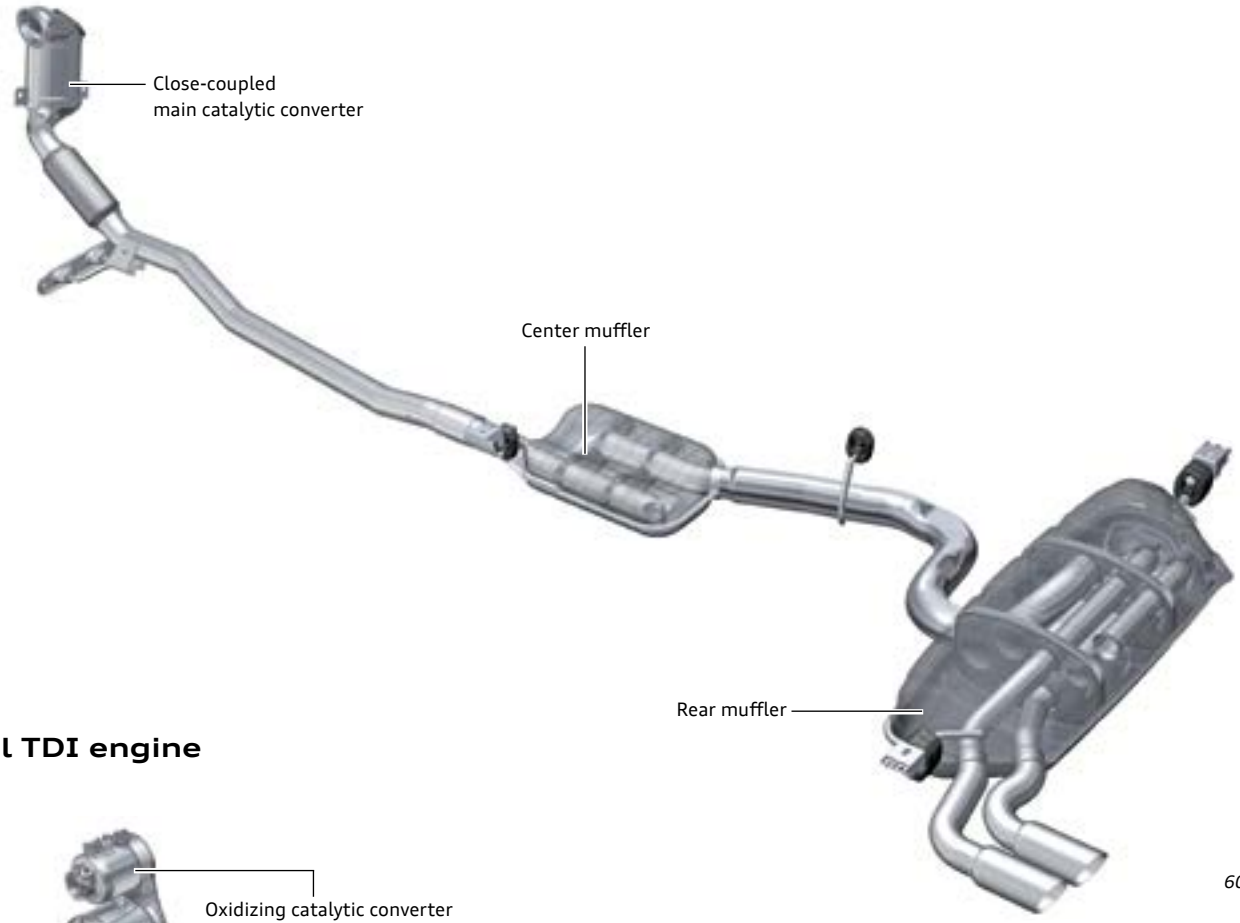
Fuel tank for 2.0 TFSI quattro models



Fuel tank for 2.0 TDI Front track models with SCR tank

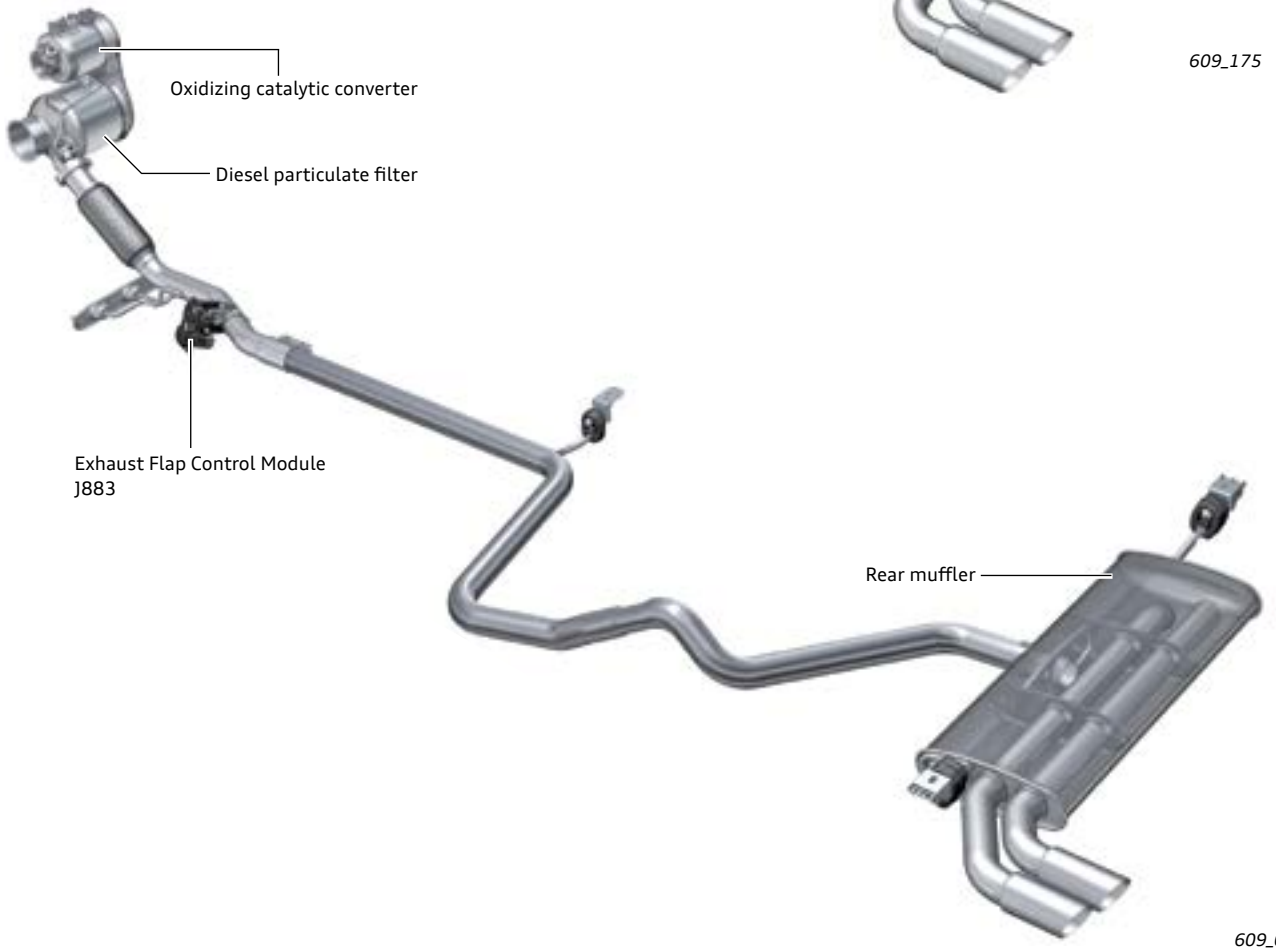
Exhaust system

1.8L TFSI and 2.0L TFSI engines



609_175

2.0l TDI engine



609_034

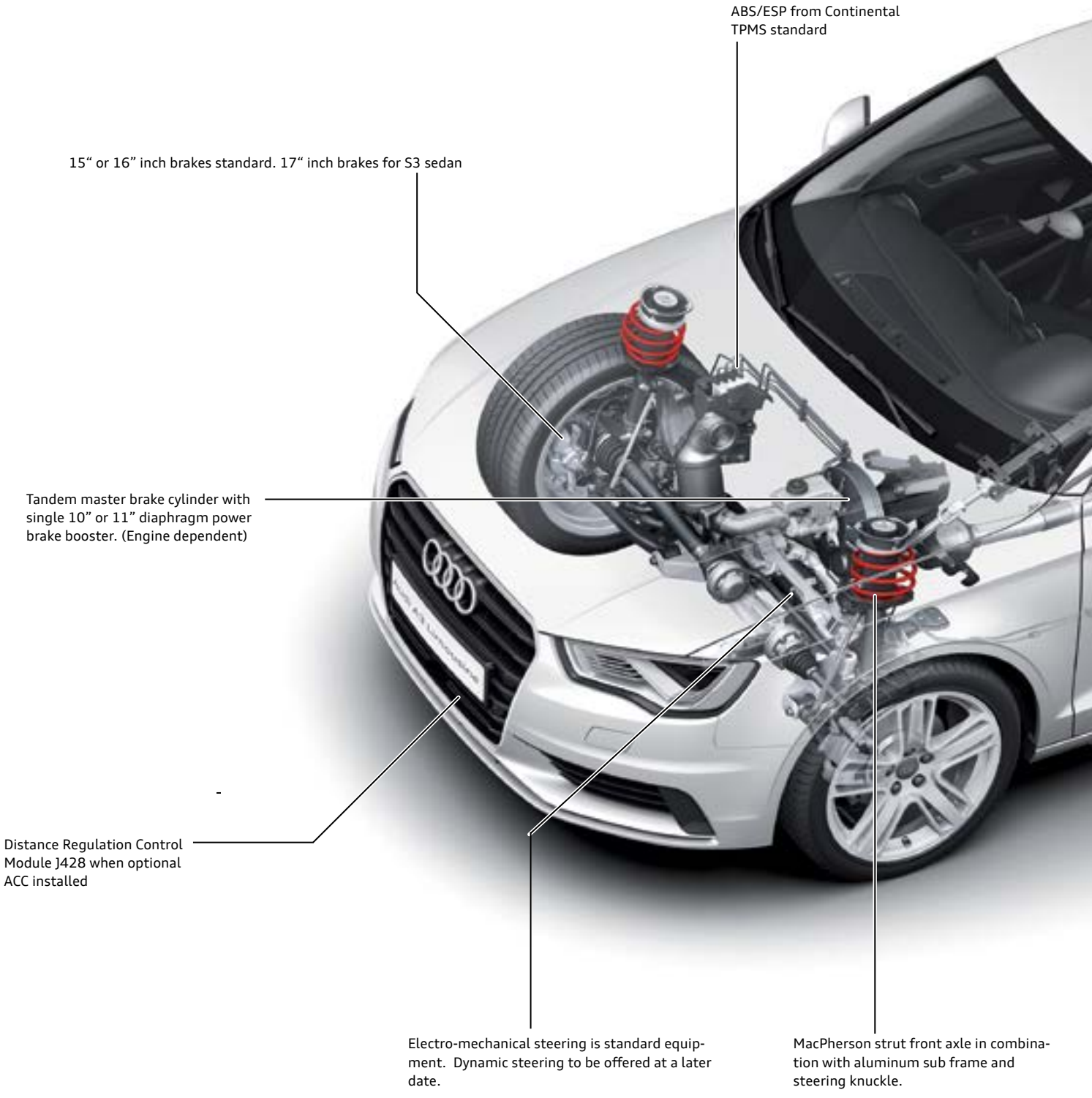
Running gear

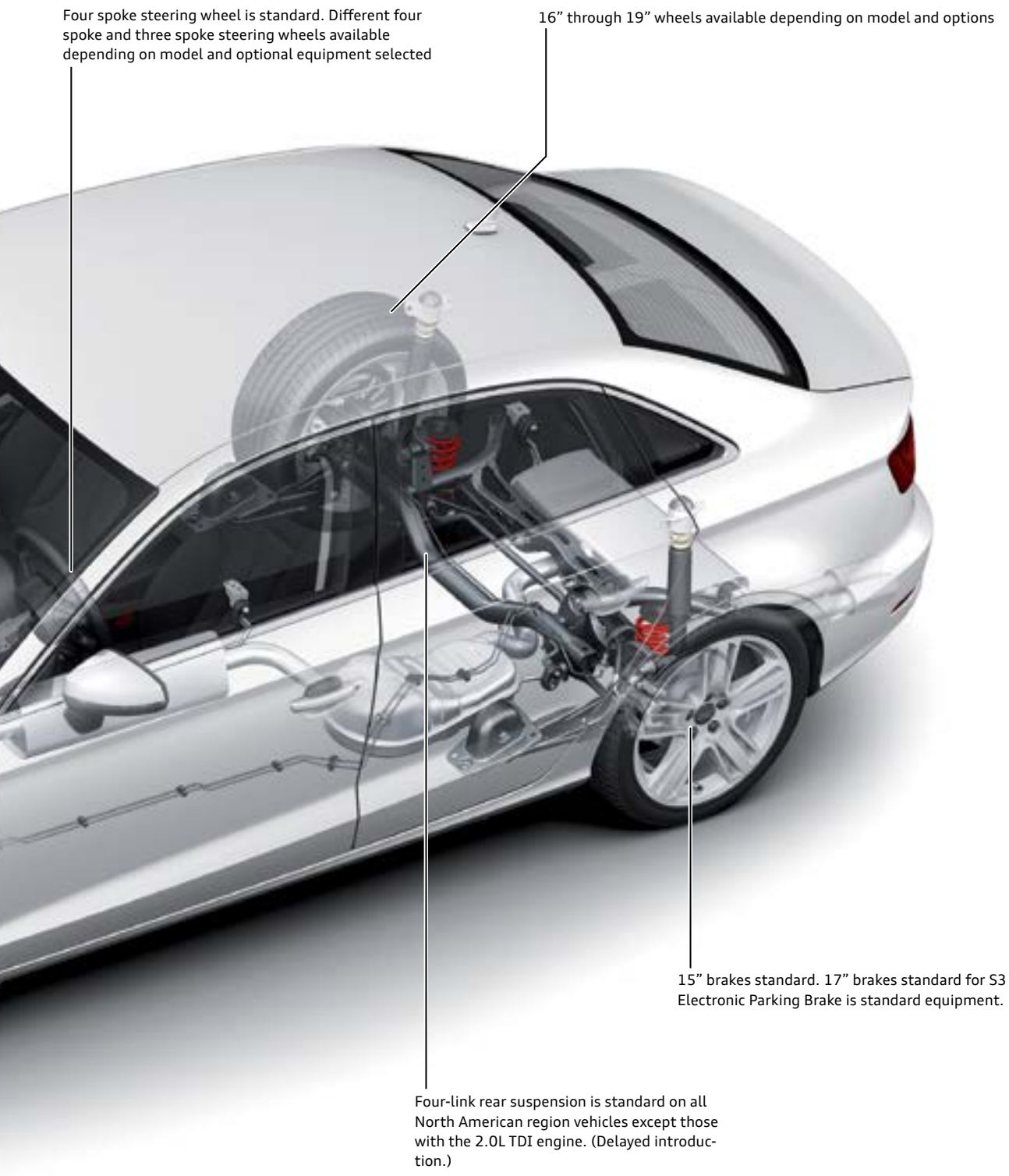
Design concept

A design goal for running gear of the A3 sedan was to have a finely balanced axle load distribution of 59% front to 41% rear. The forward placement of the front axle in relation to the body played a significant role in this accomplishment. The use of the same components across the worldwide A3 model line-up was also of major consideration.

The application of the Audi ultra lightweight strategy was also addressed by the use of aluminum axle components and smaller wheel offsets.

Overview





625_145

Reference

For more information about the A3 running gear, please refer to eSelf-Study Program 960143, *The 2015 Audi A3 Running Gear and Suspension System.*

Suspension variations

625_147

Dynamic suspension	The Dynamic suspension is standard equipment for the 2015 A3 sedan.
Sport suspension	The sports suspension is optional. In models with sports suspension, ride height is 0.59 in (15 mm) lower than in models with the standard suspension.
S line suspension	The ride height is lowered .98 in (25 mm) compared to the standard suspension. The tuning is more sporty than the Sport suspension. The S line suspension comes with 18 inch wheels as standard.
Suspension system with electronic damping control	This suspension system is available only on S3 models. It is based on the Audi magnetic ride system currently used in other Audi models.

Tire Pressure Monitoring System

The 2015 Audi A3 uses the second generation tire pressure monitoring system. It functions based on information from the ABS/ESP control module. It is identical to the system currently in use on other Audi models in terms of design, operation, driver information provided, service operations and diagnostics.

625_148

Wheels and tires

Depending on equipment package, 16 and 17 inch wheels are used in the standard trim. The 17 and 18 inch wheels are optional.

The range of tires extends from the 205/60 R16 to the 225/40 R18. The "Tire Mobility System" is standard equipment; a minispare wheel is optional.

			A3			S3
Wheels & Tires	Code	Package	1.8T	2.0T	2.0TDI	
A. 7.5J x 17 5-spoke-Star-design 225/45 R17 all-season tires	C0X H7K	—	■	■	—	—
B. 7.5J x 17 10-spoke Dynamic-design 225/45 R17 all-season tires	C5I H7K	—	—	—	■	—
C. 8.0J x 18 10-spoke-Design, Audi exclusive 225/40 R18 all-season tires 225/40 R18 summer performance tires	CL7 HX9 HJ4	—	□	□	□	—
D. 8.0J x 19 5-arm-Wing-design, Anthracite polished 235/35 R19 summer performance tires	C7D H13	—	□	□	—	—
E. 8.0J x 18 5-arm double spoke S3 design 225/40 R18 summer performance tires 225/40 R18 all-season tires	C0J HJ4 HX9	—	—	—	—	■
F. 8.0J x 19 5-parallel spoke Cast Aluminum design 225/35 R19 summer performance tires	C6H H13	—	—	—	—	□

■ = Standard
□ = Optional
— = Not Available

1 Tires are supplied and warranted by their manufacturer. High-performance tires are designed for optimum performance and handling in warm climates. They are not suitable for cold, snowy, or icy weather conditions. If you drive under those circumstances, you should equip your vehicle with all-season or winter tires, which offer better traction under those conditions. We suggest you use the recommended winter or all-season tire specified for your car or its equivalent. These high-performance tires also have a lower aspect ratio that aids performance and handling; however, in order to avoid tire, rim or vehicle damage, it is important that the inflation pressure is regularly checked and maintained at optimum levels. Please also remember in making your selection that, while these tires deliver responsive handling, they may ride less comfortably and make more noise than other choices. Finally, these tires may wear more quickly than other choices.

Electrical system

Audi drive select

The 2015 A3 is equipped with Audi drive select. At model introduction, the engine/transmission, power steering and Adaptive cruise control can be tailored to the driver through the Audi drive select feature. The driver can choose between three operating modes: comfort, auto and dynamic. In addition, the vehicle set-up can be customer configured using individual mode. More vehicle systems will be added to the Audi drive select at a later date.

Depending on the infotainment system installed, Audi drive select can be configured either using the button in the instrument panel or via the Car menu in the MMI.

The selected mode of the system is indicated in the MMI display. Individual mode is only available with infotainment versions MMI Navigation and MMI Navigation with Audi connect.

Functional features:

- The mode previously selected is active when the vehicle restarts.
- The individual mode settings are automatically assigned to the vehicle key in use.
- The mode can be changed when the vehicle is stationary or while driving (requirement: terminal 15 "on").
- To activate a selected mode for the Transmission/engine, the accelerator pedal must briefly return to the idle position.

Controllable systems at the 2015 A3 model introduction

drive select
Operation by central operating switch

Accessible via Car menu; select with rotary-push button

Accelerator/engine
Variable characteristic

Steering
Variable steering torque

adaptive cruise control
Variable longitudinal acceleration

Automatic transmission
Variable shift program

Functional characteristics

	comfort		auto		dynamic	
Selector lever position	D	S	D	S	D	S
Engine						
Power/torque	normal	normal	normal	normal	normal	normal
Load change	balanced	sporty	balanced	sporty	balanced	sporty
Accelerator pedal	balanced	sporty	balanced	sporty	balanced	sporty
Transmission						
Shift characteristics	"D"[3]	"S"[2]	"D"[3]	"S"[2]	"D"[3]	"S"[2]

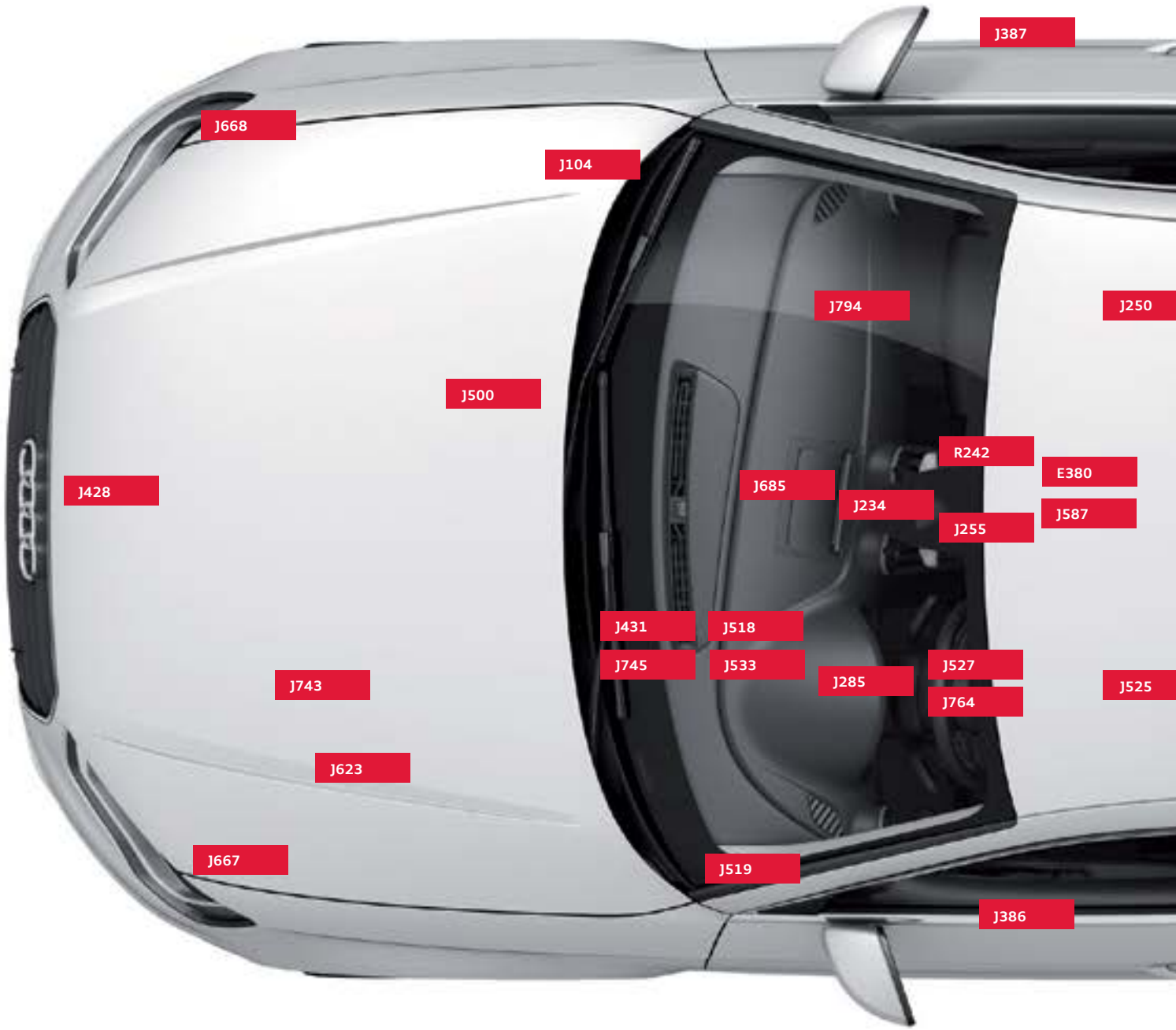
[2] sporty
[3] balanced

Driveline-independent vehicle systems

	comfort	auto	dynamic
Steering	comfortable	balanced	sporty
Damper control	comfortable	balanced	sporty
Reversible Safety Belt Tensioner	standard	standard	Deployment point adapted
Adaptive cruise control	comfortable	balanced	sporty

Installation locations of control modules

Refer to the current service literature for details of control module positions, as well as instructions for installation and removal.



Key:

E380 Multimedia System Control Head

J104 ABS/ESP Control Module
J234 Airbag Control Module
J250 Electronic Damping Control Module
J255 Climatronic Control Module
J285 Instrument Cluster Control Module
J386 Driver Door Control Module
J387 Front Passenger Door Control Module
J428 Distance Regulation Control Module
J431 Headlamp Range Control Module
J492 All Wheel Drive Control Module
J500 Power Steering Control Module
J518 Access/Start Authorization Control Module
J519 Vehicle Electrical System Control Module 1
J525 Digital Sound System Control Module
J527 Steering Column Electronics Control Module
J533 Data Bus On Board Diagnostic Interface
J587 Selector Lever Sensor System Control Module

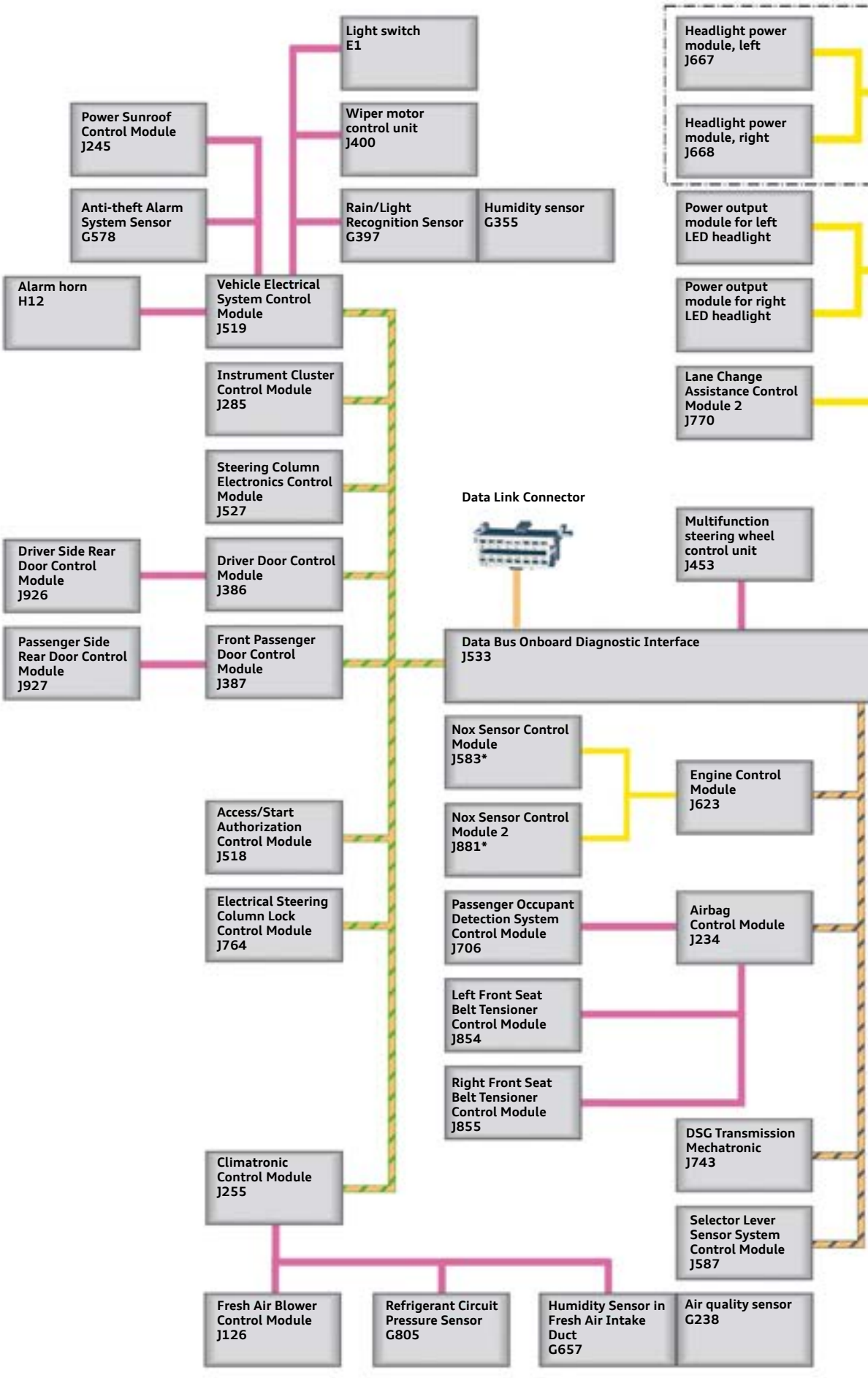
625_097

J623 Engine Control Module
J667 Left Headlamp Power Output Stage
J668 Right Headlamp Power Output Stage
J685 Front Information Display Control Head
J743 DSG Transmission Mechatronic
J745 Cornering Lamp and Headlamp Range Control Module
J764 Electronic Steering Column Lock Control Module
J769 Lane Change Assistance Control Module
J770 Lane Change Assistance Control Module 2
J772 Rearview Camera System Control Module
J794 Information Electronics Control Module 1
J926 Driver Side Rear Door Control Module
J927 Passenger Side Rear Door Control Module

R242 Driver Assistance Systems Front Camera

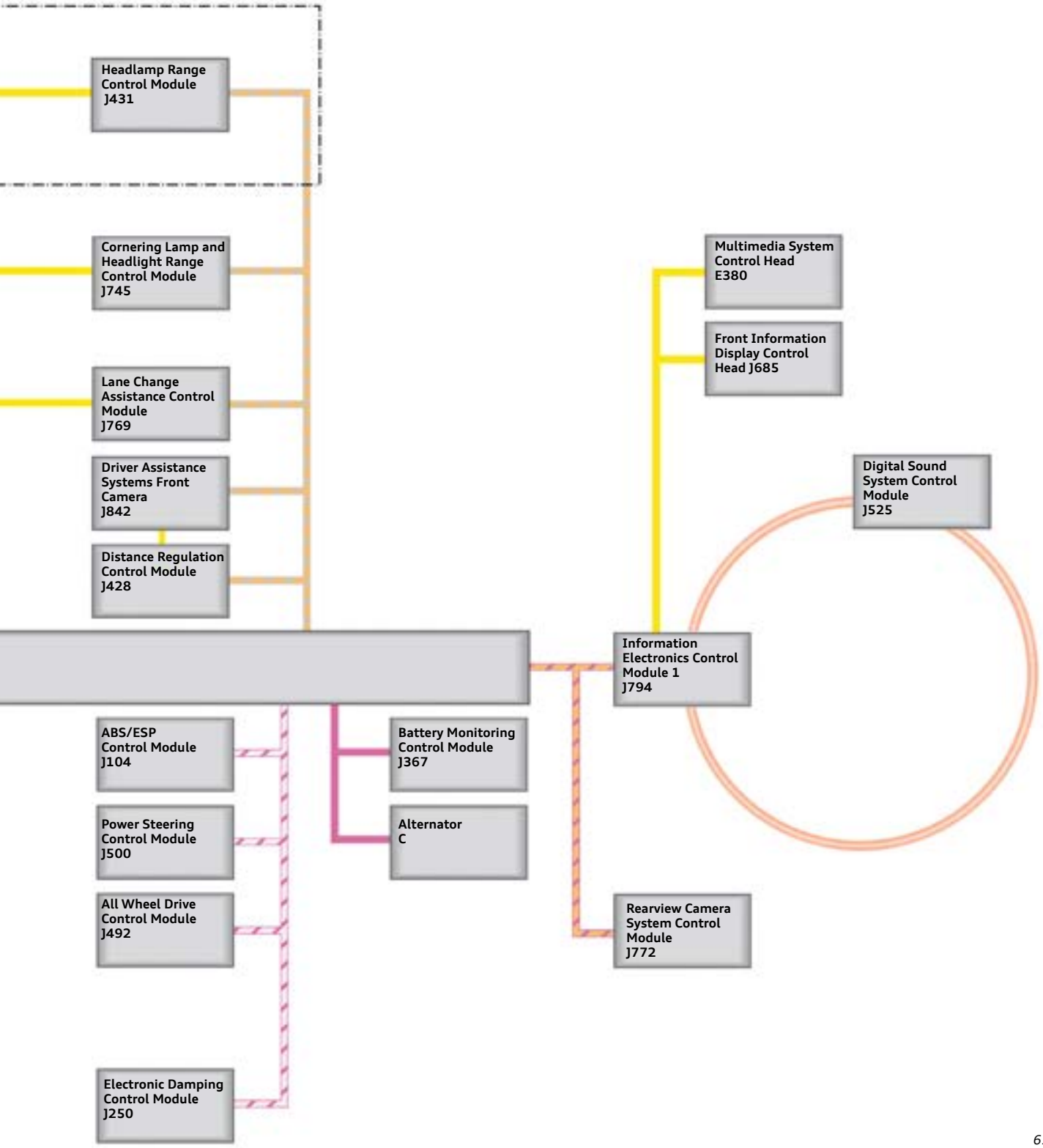
Topology

The topology shows all control modules with connectivity to the data bus system. Some of the control modules shown here are optional, country-specific equipment, or will be introduced at a later date. Be aware that all the modules shown will not be installed on every vehicle.



*2.0L TDI engine only

For example, Cornering Lamp and Headlight Range Control Module J745 would never be installed on the same vehicle as Headlamp Range Control Module J431.



610_001_pkd

Key:

- Powertrain CAN bus
- Convenience CAN bus
- Extended CAN bus
- Infotainment CAN bus
- Diagnostics CAN bus
- Suspension CAN bus
- LIN bus
- Sub-bus systems
- MOST bus

Climate control

Introduction

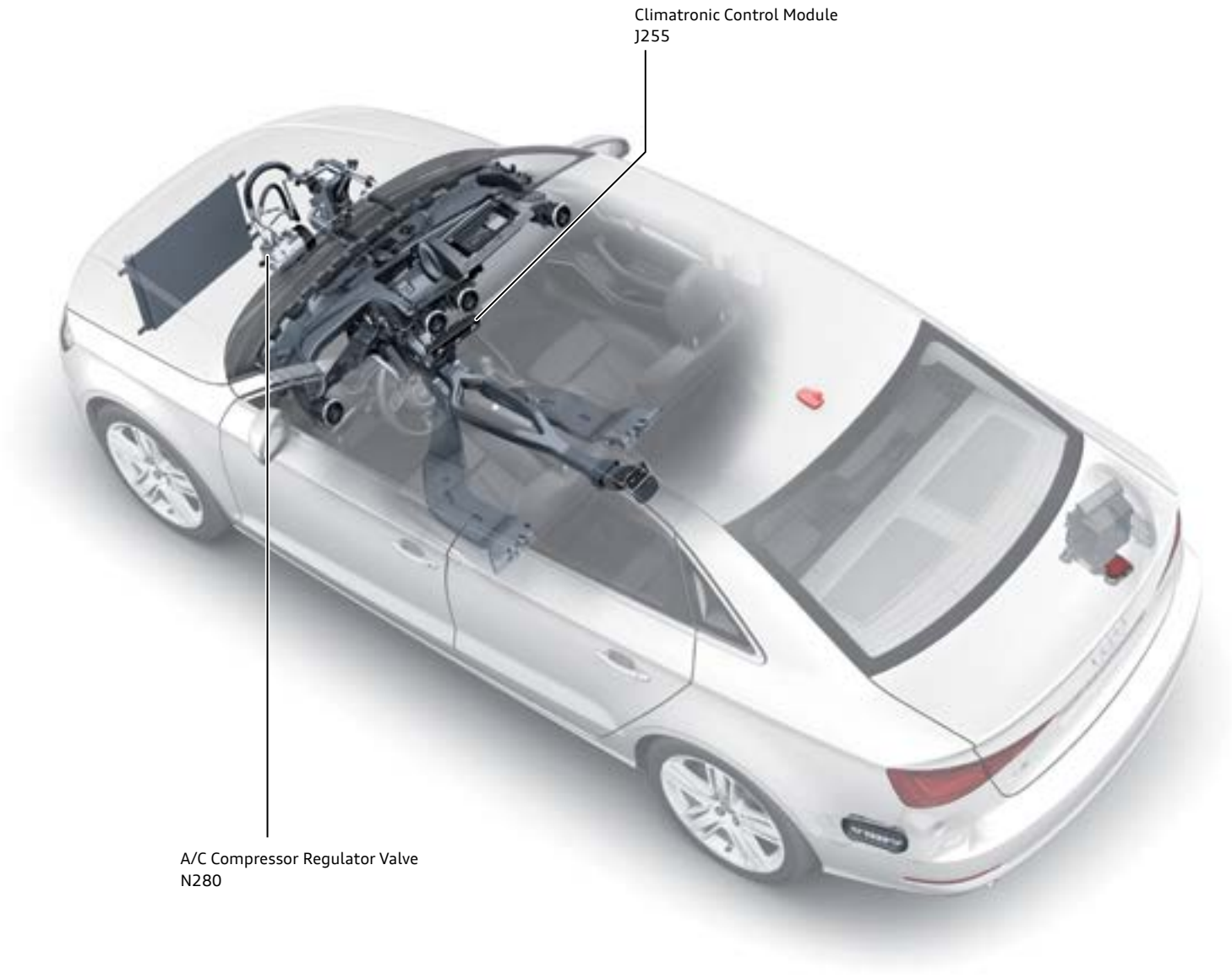
Heating / air conditioning system versions

Two heating and air conditioning systems are specified for the 2015 Audi A3 depending on model.

- manually controlled air conditioning system
- Climatronic

The Climatronic system has a moisture and enthalpy control system. The moisture control system is used to detect windshield fogging.

Enthalpy is a measure of the energy content in the air conditioning system. Air conditioning efficiency is ensured by precision control of the fresh air to recirculated air ratio inside the vehicle.



625_044

Operation

The two versions differ from one another with respect to their equipment specification. All versions are optionally available with seat heater control buttons. The seat heater is a three-stage system and the selected heating level is indicated by an LED in the respective button.

Some of the rotary controls in both versions have multiple functions, such as for turning cooling or automatic air conditioning ON and OFF.

Both versions have a dust and pollen filter. The Climatronic system has an activated charcoal dust and pollen filter. In combination with the Air Quality Sensor G238, the activated charcoal component in the filter works to reduce pollutant emissions in the fresh air inside the vehicle.

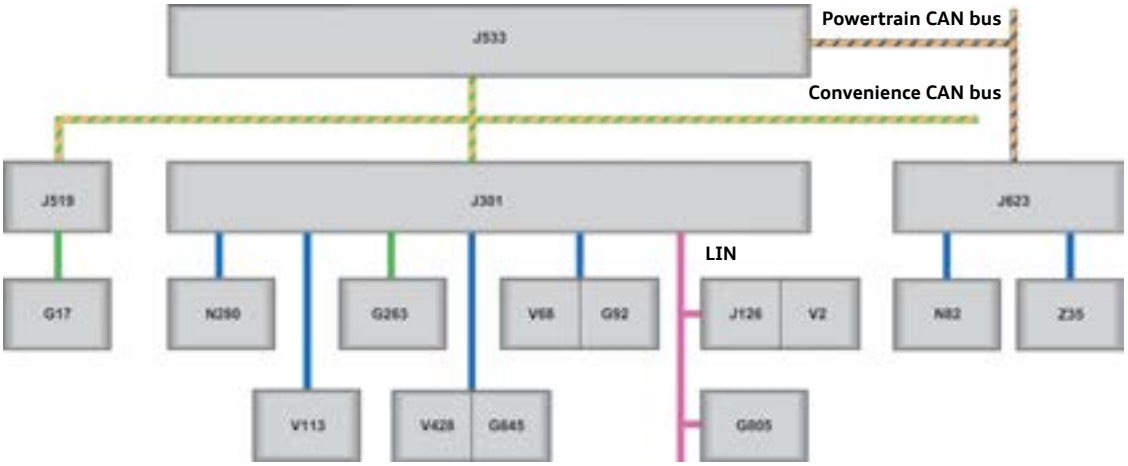
The dust and pollen filter can be replaced through the open glove compartment.

The table shows an overview of the main functions of the individual versions:

	Manual air conditioning system	Climatronic
Control panel and control module	A/C Control Module J301	Climatronic Control Module J255
		
Functions on the control panel	Three rotary controls for: ▶ Temperature ▶ Blower ▶ Air distribution Manual air recirculation button Heated rear window button Optional seat heater button, three-stage AC button	Two rotary controls for driver and passenger side outlet temperature AC button AUTO button Rotary blower control Defrost button Manual air recirculation button Heated rear window button Three buttons for setting the air distribution Optional seat heater button, three-stage
Number of temperature zones	1	2
Air flow and air distribution in the occupant cell	Defroster vents Instrument panel outlets, left-center-right Footwell outlets, right/left Rear footwell outlets, right/left	Defroster vents Instrument panel outlets, left-center-right Footwell outlets, right/left Rear footwell outlets, right/left Rear outlets
Moisture and enthalpy control	no	yes
AC modes	no	Two AC modes ▶ normal ▶ eco
Automatic air recirculation control	no	yes
Air quality sensor	no	yes
Sun sensor	no	yes
Interior moisture sensor	no	yes
Exterior moisture sensor	no	yes
Glove compartment cooling	no	no

Connected components

Manual air conditioning system



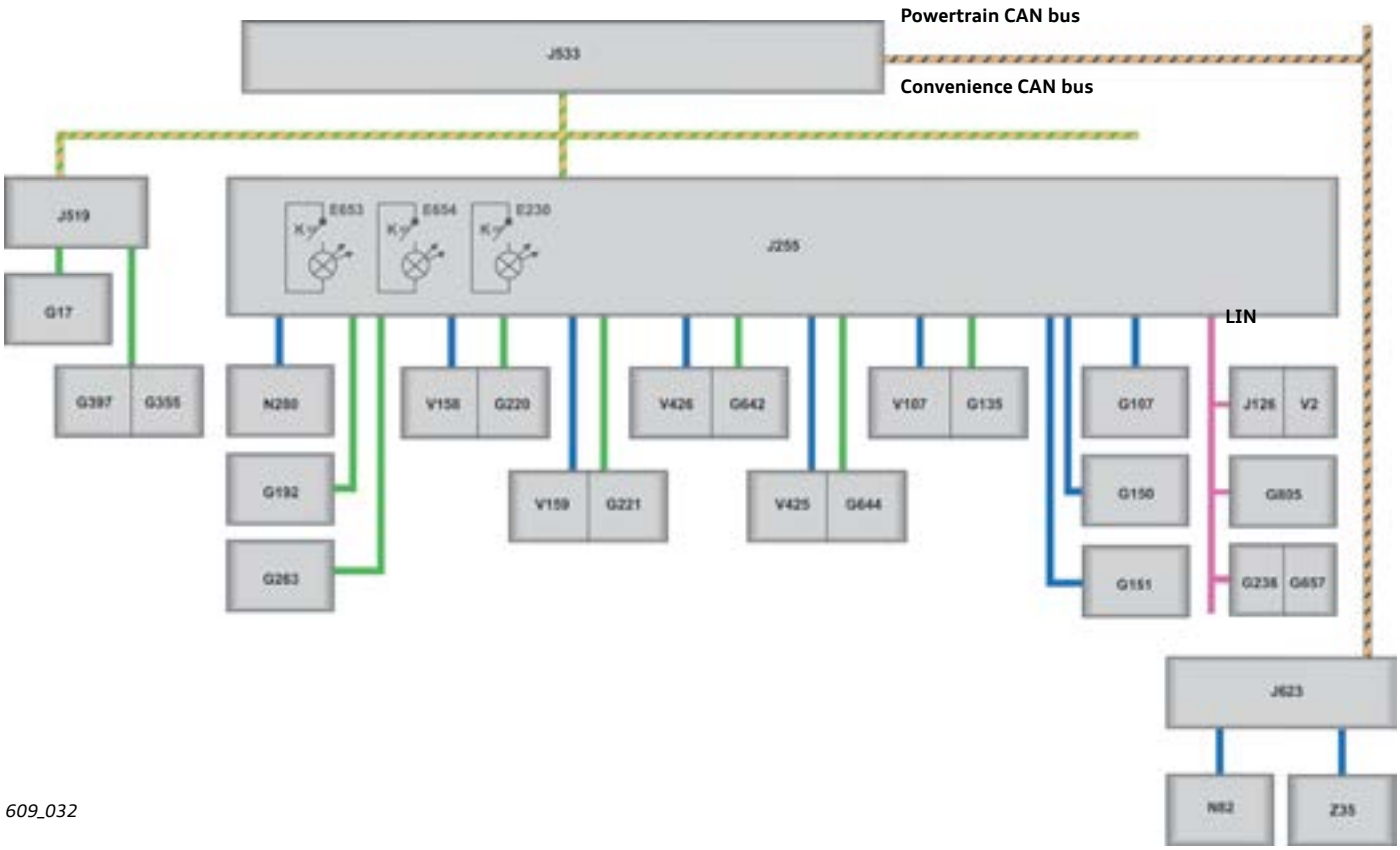
609_031

A/C Control Module J301 evaluates sensor signals and controls the actuators of the A/C system. Refrigerant Circuit Pressure Sensor G805 communicates with J301 through a LIN bus.

Depending on vehicle engine type, both air conditioning systems may have Coolant Shut-off Valve N82 or an Auxiliary Heater Heating Element Z35.

Connected components

Climate control



609_032

To control the internal energy (enthalpy) of the climate control system, Climatronic Control Module J255 requires additional information about the relative humidity of the outside air as well as that of the interior.

To this end, Humidity Sensor G355 supplies interior air data to J255 via the Convenience CAN bus. Outside air humidity data is sent directly to J255 by a LIN signal from Humidity Sensor in Fresh Air Intake Duct G657.

Key to figures on pages 63 and 64:

E230 Rear Window Defogger Button
E653 Left Seat Heating Button
E654 Right Seat Heating Button

G17 Outside Air Temperature Sensor
G92 Temperature Regulator Door Motor Position Sensor
G107 Sunlight photosensor
G135 Defroster Door Motor Position Sensor
G150 Left Vent Temperature Sensor
G151 Right Vent Temperature Sensor
G192 Footwell Vent Temperature Sensor
G220 Left Temperature Door Potentiometer/Actuator
G221 Right Temperature Door Potentiometer/Actuator
G238 Air quality sensor
G263 Evaporator Vent Temperature Sensor
G355 Humidity Sensor
G397 Rain/Light Recognition Sensor
G642 Front Air Distribution Door Motor Position Sensor
G644 Fresh Air/Recirculating Air/Back Pressure Door Motor Position Sensor
G645 Air Distribution Door Motor Position Sensor
G657 Humidity Sensor in Fresh Air Intake Duct
G805 Refrigerant Circuit Pressure Sensor

J126 Fresh Air Blower Control Module
J255 Climatronic Control Module
J301 A/C Control Module
J519 Vehicle Electrical System Control Module
J533 Data Bus On Board Diagnostic Interface
J623 Engine Control Module

N82 Coolant shutoff valve
N280 A/C Compressor Regulator Valve

V2 Fresh air blower
V68 Temperature Regulator Door Motor
V107 Defroster Door Motor
V113 Recirculation Door Motor
V158 Left Temperature Door Motor
V159 Right Temperature Door Motor
V425 Fresh Air/Recirculating Air/Back Pressure Door Motor
V426 Front Air Distribution Door Motor
V428 Air Distribution Door Motor

Z35 Auxiliary Heater Heating Element (in diesel models)

Infotainment

In response to the speed at which the development cycles for information and entertainment systems occur, the automotive industry has had to shorten its development cycles as well. Keeping up to date with the latest advances is a growing challenge for car makers.

To meet this challenge, the Volkswagen Group has introduced the Modular Infotainment Platform (MIB).

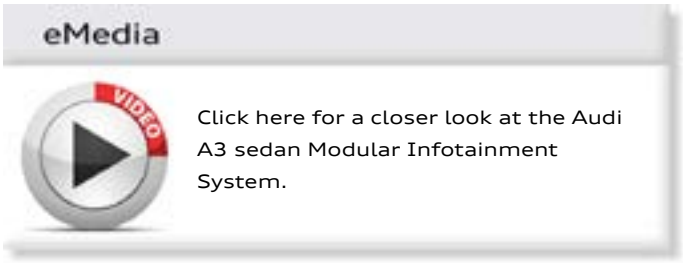
Central to the development of the MIB, Information Electronics Control Module 1 J794, has been re-designed as a modular component. The control module architecture allows the hardware to be easily and economically updated so that it always incorporates the latest technological advances.

An important component is the graphics processor made by market-leader Nvidia, with whom Audi enjoys a very successful business relationship. The latest Nvidia processors will continue to be used in Audi vehicles in the future. The new platform means that it will be possible to use the same central processing units (J794) across the entire Group. So, in the future it will be possible to run brand specific variants on four standardized hardware platforms.

Overview of versions

In the North American market, the following versions of the MIB will be available on the 2015 Audi A3:

- Standard MIB - MMI radio
- High-spec MIB
  - MMI navigation plus
  - MMI navigation plus with Audi connect



Reference

For more information about the infotainment systems of the 2015 A3, please see eSelf-Study Program 970143, *Modular Infotainment Platform (MIB)*.

Standard MIB - MMI radio	High spec MIB MMI navigation plus	High spec MIB MMI navigation plus with Audi connect
		
		
5.8“ TFT colour monitor with 400 x 240 pixel resolution	5.8“ TFT colour monitor with 400 x 240 pixel resolution	7.0“ TFT colour monitor with 800 x 480 pixel resolution
	2D navigation system	3D hard drive navigation system
		MMI touch
AM/FM radio with phase diversity	AM/FM radio with phase diversity and TMC tuner	AM/FM radio with phase diversity and background tuner
Car menu	Car menu	Car menu
CD drive (MP3, WMA, AAC[1)])	CD drive (MP3, WMA, AAC)	DVD drive (audio/video, MP3, AAC, WMA, MPEG4)
1 SD card reader (SDHC cards with up to 32 GB of memory)	2 SD card readers (SDHC cards with up to 32 GB of memory)	2 SD card readers (SDHC cards with up to 32 GB of memory)
		approximately 10 GB for jukebox
AUX (with AMI)	Audi music interface with iPod cable (UE7)	Audi music interface with iPod cable (UE7)
Audi Sound System (9VD)	Audi Sound System (9VD)	Audi Sound System (9VD)
	Bluetooth interface for HFP and A2DP (9ZX)	Bluetooth interface for HFP and A2DP (9ZX)
	Speech dialogue system	Premium speech dialogue system
		1 sim card reader
Bluetooth interface for HFP and A2DP (9ZX) and speech dialogue system		
Optional Audi music interface with iPod cable (UE7)		
		Bluetooth car phone BTA (market-dependent, Audi connect incl. car phone) (9ZK)
SDARS HD radio (QV3)	SDARS HD radio (QV3)	SDARS HD radio (QV3)
	Bang & Olufsen Sound System (9VS)	Bang & Olufsen Sound System (9VS)

[1)] The MMI Radio can only play back AAC files only if the optional Audi music interface is installed.

On a world-wide basis, Audi offers three main configuration levels for the Modular Infotainment Platform:

- Entry MIB
- Standard MIB
- High-spec MIB

Each of the main configurations has its own sub-configurations depending on the optional equipment installed. All of the MIB configurations use Information Electronics Control Module 1 J794 as the central processing unit.

Depending on version, J794 controls the following functions:

- Control of information and entertainment systems
- System master and diagnostics master for MOST
- Radio tuner
- Digital radio tuner (*SDARS**)
- *CD** or *DVD** drive
- Internal audio amplifier for Audi sound system with 180 watts power (6 channels, 3 x 20W + 3 x 40W) (9VD)
- Up to two *SD** card readers
- Bluetooth interface (*HFP**, *A2DP** and, with Bluetooth car phone, also *SAP**)
- Telephone module and *SIM** card reader
- Navigation system
- Voice control
- WiFi hotspot

In the North American market, three versions of the MIB will be available beginning with the 2015 Audi A3*. They are:

- Standard MIB (Audi MMI® radio*)
- High spec MIB (Audi MMI® navigation plus**)
- High spec MIB (Audi MMI® navigation plus with Audi connect***)

Front panel of J794 for Entry MIB *618_003*

Front panel of J794 for Entry plus MIB *618_004*

Front panel of J794 for Standard MIB, navigation system version *618_006*

Front panel of J794 for Standard MIB, radio version* *618_005*

Front panel of J794 for High-spec MIB** *618_007*

Front panel of J794 for High-spec MIB with Audi Connect*** *618_008*

Standard MIB

In terms of functionality and specifications, the Standard MIB is comparable with the RMC Radio Media Center. This will be marketed in the North American region as Audi MMI® radio.

J794 for the Standard MIB always has a MOST bus connection. If no optional equipment requiring MOST data transfer is installed, the MOST connection is unused.

Standard MIB (MMI® radio)

MMI® radio is based on the Standard MIB and offers the following features:

- Radio with phase diversity module, FM twin tuner (frequency modulation) and AM tuner (amplitude modulation)
- Single CD drive which supports MP3, WMA and AAC* files
- An SD card reader for MP3, WMA and AAC files
- Car menu
- Motorized 5.8-inch color TFT screen with 400 x 240 pixel resolution
- A discrete control panel in the center console
- AUX IN socket (UE3)
- SDARS Tuner (digital radio) (QV3)
- Internal audio amplifier for Audi sound system with 180 watts power (6 channels, 3 x 20W + 3 x 40W) (9VD)
- Bluetooth interface for HFP and A2DP (9ZX)

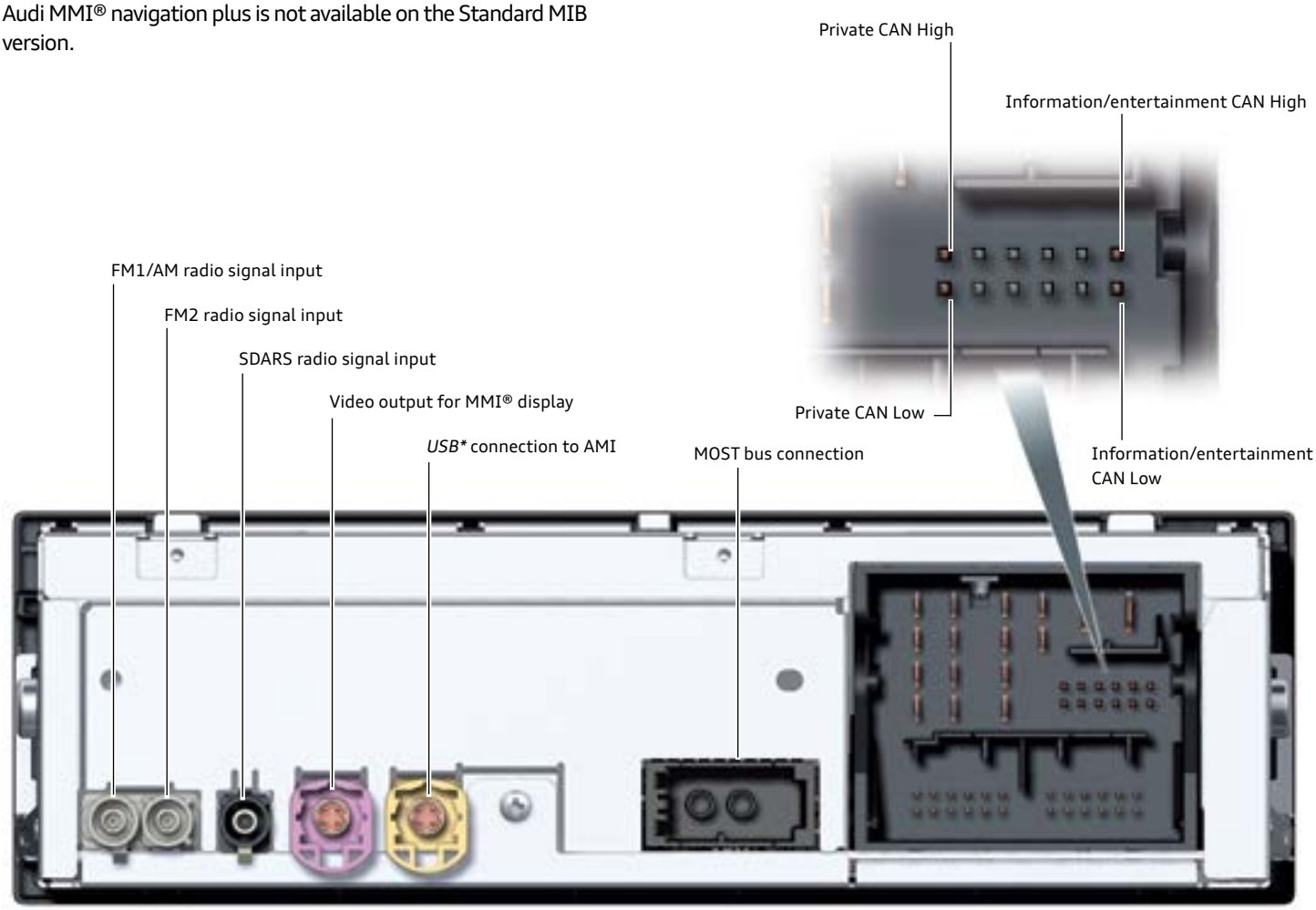
Standard MIB can also be equipped with the following optional feature:

- Audi music interface (UE7)

The PR number for the Standard MIB is i8D with the suffix 7Q0. Audi MMI® navigation plus is not available on the Standard MIB version.

MMI® screen for Standard MIB (Audi MMI® radio) *618_016a*

Front panel of J794 for Standard MIB, (Audi MMI® radio) *618_005*



Rear panel of J794 for Standard MIB, (MMI® radio) *618_018*

High spec MIB with navigation

The High-spec MIB is the current high-end version of the Modular Infotainment Platform. Two versions will be available in the North American market. In both versions, Information Electronics Control Module 1 J794 has a MOST bus connection. If no other optional equipment requiring a MOST connection is installed on the vehicle, the connection is not used.

The High-spec MIB represents a consistent step forward from the 3G + MMI and features new 3D screen views and SSD (solid state drive).

As mentioned earlier, Information Electronics Control Module 1 J794 MIB incorporates an Nvidia Tegra processor. It is a multi-core processor that generates ultra-high resolution graphics as well as offering faster rendering of current audio and video formats. The Tegra chip requires substantially less energy than previous multimedia processors and fits perfectly with the Audi efficiency philosophy.

The Tegra chip can display entire cityscapes in three-dimensional views – the driver sees the street that he is driving along in photo-realistic quality.

The High-spec MIB is also the only version of the MIB that can play video files directly.

The High-spec MIB offers the following features:

- Radio with phase diversity module, FM twin tuner (frequency modulation) and AM tuner (amplitude modulation)
- Single DVD drive for audio and video files
- Two SD card readers for audio and video files
- SSD solid state drive (64 GB)
- Jukebox (approximately 11GB on the 2015 Audi A3)
- 3D navigation system with navigation data on SSD (data supplier: Navteq)
- Audi MMI® touch
- Audi music interface
- Car menu
- Bluetooth interface for HFP and A2DP
- Premium interactive voice control system
- Provision of predictive route data
- 7.0-inch motorized TFT display
- Discrete control panel with MMI® touch in center console
- AUX IN socket (UE3)
- SDARS tuner (NAR spec digital radio) (QV3)
- Internal audio amplifier for Audi sound system with 180 watts power (6 channels, 3 x 20W + 3 x 40W) (9VD)

Front panel of J794 for High-spec MIB without Audi connect (MMI® navigation plus) *618_007*

Rear panel of J794 for High-spec MIB *618_027*

Front panel of J794 for High-spec MIB with Audi connect (MMI® navigation plus with Audi connect) *618_008*

Rear panel of J794 for High-spec MIB with Bluetooth and Audi connect *618_029*

Networking

Information Electronics Control Module 1 J794 is connected to Data Bus On Board Diagnostic Interface J533 by the Infotainment CAN bus in all versions of the MIB. It is a high-speed bus with a data transfer rate of 500 kbits/s.

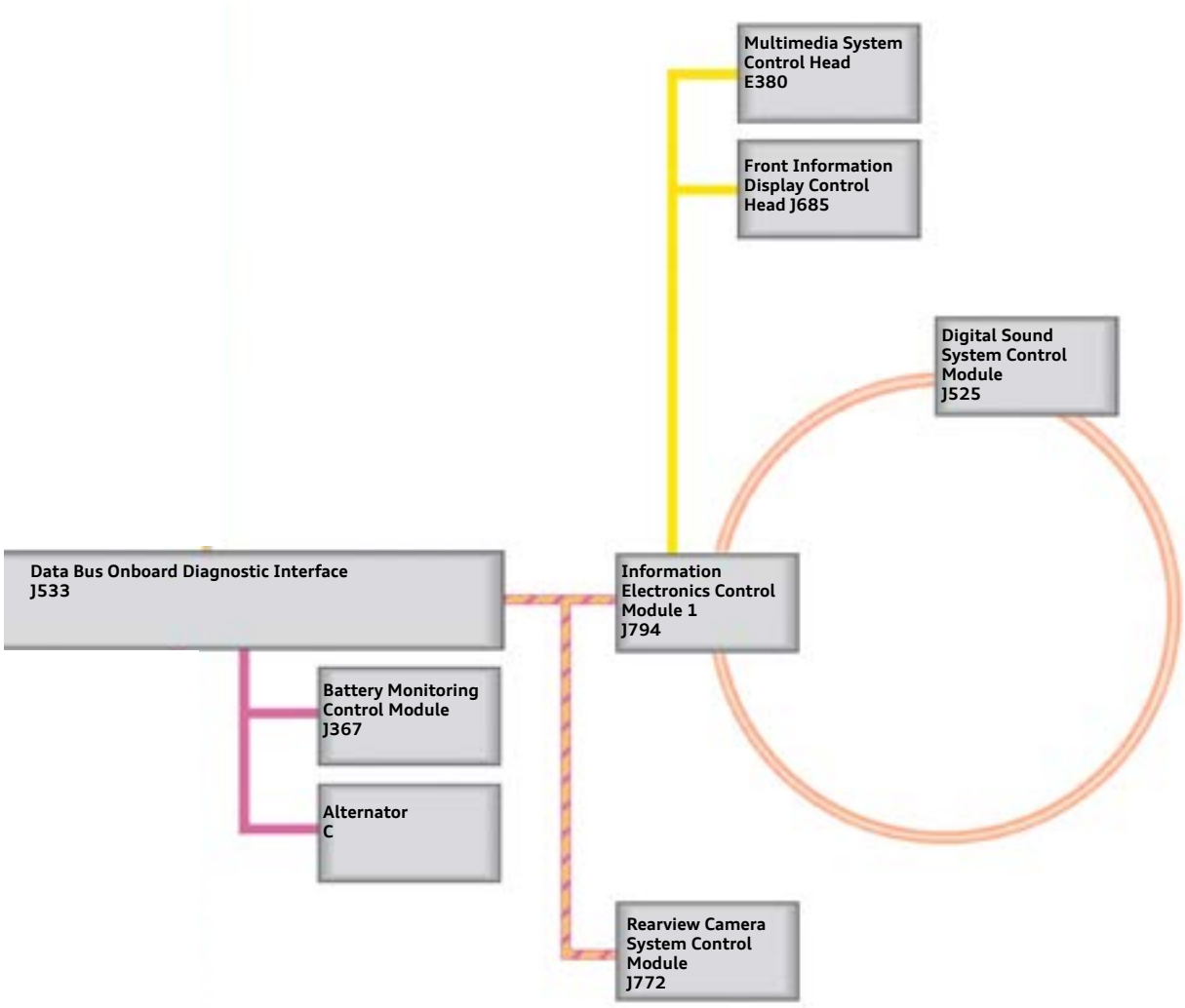
Front Information Display Control Head J685 and Multimedia System Control Head E380 are connected to J794 via a private CAN bus for the first time. This bus is also a high-speed bus with a 500 kbit/sec transfer rate.

When equipped with either the Audi sound system or the optional Bang & Olufsen sound system, the 2015 A3 will also have the MOST bus in addition to the Infotainment CAN bus. This is the first time the Infotainment and MOST bus have been simultaneously integrated in a vehicle.

The MOST bus in the A3 is the new MOST 150 bus capable of a data transfer rate of 150 Mbit/sec. Information Electronics Control Module 1 J794 acts as both the system master and diagnostic master for the MOST bus.

With the combination of Infotainment CAN bus and the MOST bus, an open circuit in the MOST bus will not cause a total failure of the MMI. All functions which are executed directly by J794 will remain available. However, audio would no longer be output via an external amplifier.

Rearview Camera System Control Module J772 is also connected to control modules J794 and J533 by the Infotainment CAN bus.



610_001_pkd

Key:

- Infotainment CAN bus
- Sub-bus system
- MOST bus
- LIN bus

Multimedia System Control Head E380

Two different versions of Multimedia System Control Head E380 are available in the North American market. To allow even more intuitive operation, the number of buttons on the control units has been optimized compared to the previous systems. There are now two new rocker buttons which can be used to choose between two menus in each case.

The volume control also has a right/left rocker action. It can be used to skip backwards or forwards to the previous/next track on the Music menu, for example.

The control panels are connected to Information Electronics Control Module 1 J794 via a private CAN bus.

If the vehicle is equipped with MIB Standard (MMI® radio), the following functions are available:

- Tone
- CAR
- Phone
- Media

If the vehicle is equipped with the High-spec MIB system (MMI® navigation plus, MMI® navigation plus with Audi connect), the left rocker button is used to choose between Telephone and Navigation. The rotary push-button is slightly larger than on the other versions.

Integrated in the rotary push-button is the touch-sensitive input zone (Audi MMI® touch). This can be used to control the following functions:

- Entry of letters, numbers and characters using automatic handwriting recognition
- Scrolling through album covers
- Operating DVD main menu
- Moving the navigation map

The combination of rotary push-button and MMI® touch is also referred to as the "touchwheel".

MMI® Standard control panel *618_060*

High-spec control panel on vehicles with NAV (Audi MMI® touch is standard) *618_062*

MMI display

Front Information Display Control Head J685

The MMI display screen of the 2015 A3 is mounted in the instrument panel and is retracted electrically. The display is only 0.4 in (11 mm) thick. This was achieved by attaching the actual TFT screen directly to its ultra-light magnesium housing.

There are two versions of the screen with the following features:

- 5.8“ TFT color monitor with 400 x 240 pixel resolution
- 7.0“ TFT color monitor with 800 x 480 pixel resolution

The operating mechanism for the display has the following electrical components:

- Display Opening/Closing Motor V301 (with Hall sensor)
- Two limit switches - Display Open-Stop Switch F330 and Display Closed-Stop Switch F331

The number of motor revolutions is registered by the Hall sensor while the display is extending and retracting and then evaluated by Information Electronics Control Module J794. The number of motor revolutions dictates the end position of the display. In addition, both display limit switches are evaluated. The display extends and retracts automatically or if necessary, by pushing Display Unit Button E506.

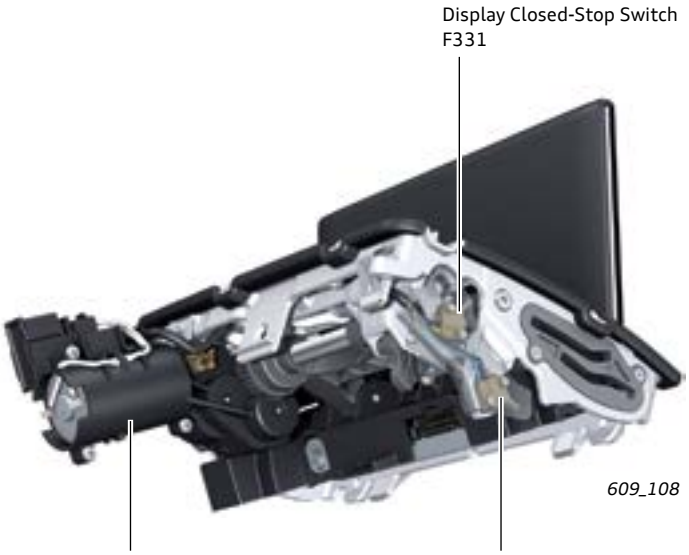
If Display Open-Stop Switch F330 is triggered while the display is extended (for example, by pushing down on the display)the electric motor is activated and the display retracts automatically. This safety function lessens the possibility of damage.

5.8“ TFT color screen with MMI Radio *618_016a*

7.0“ TFT color screen with MMI Navigation plus *618_030a*

609_107

MMI display



MMI display mechanism

Audi Connect

Overview

Audi connect is a wireless/internet-based system which brings together applications that connect present-day and future Audi models with the internet. Audi connect brings the benefits of an increasingly networked world into the vehicle; services supported by Audi connect are tailored for in-vehicle use.

For the 2015 Audi A3, the vehicle must be equipped with Audi MMI navigation plus with Audi connect.

New services will be available for the 2015 A3 in addition to the existing Audi connect services.

Previous services and functions include:

- Audi traffic information online
- Google Earth
- WLAN hotspot

New services include:

- Facebook
- Twitter

Several services, such as "Google Earth", are already activated and ready for use on delivery of the vehicle. Other services, such as "Facebook", can only be used after they have been activated via "myAudi". For this purpose, customers must register online at "myAudi". Customers can then configure their vehicle here. If the configured vehicle meets the requirements for Audi connect, additional services available for this vehicle can also be activated.

618_077b

Audi connect — Google Earth 609_096

Audi connect — activated additional services 609_097

Reference

For more detailed information about Audi connect, please see eSelf-Study Program 970143, *Modular Infotainment Platform (MIB)*

LTE

On the A3 sedan equipped with MMI Navigation plus with Audi Connect, the UMTS-enabled phone module once responsible for telephone and Internet connection has been replaced by an LTE data module. This means shorter loading times for Audi connect services and a higher streaming speed for data from and to the Internet via the Wi-Fi hotspot.
.
LTE stands for long term evolution and is also referred to as the fourth generation of mobile communication standards. The name of LTE denotes that the development of this standard will continue in the future.

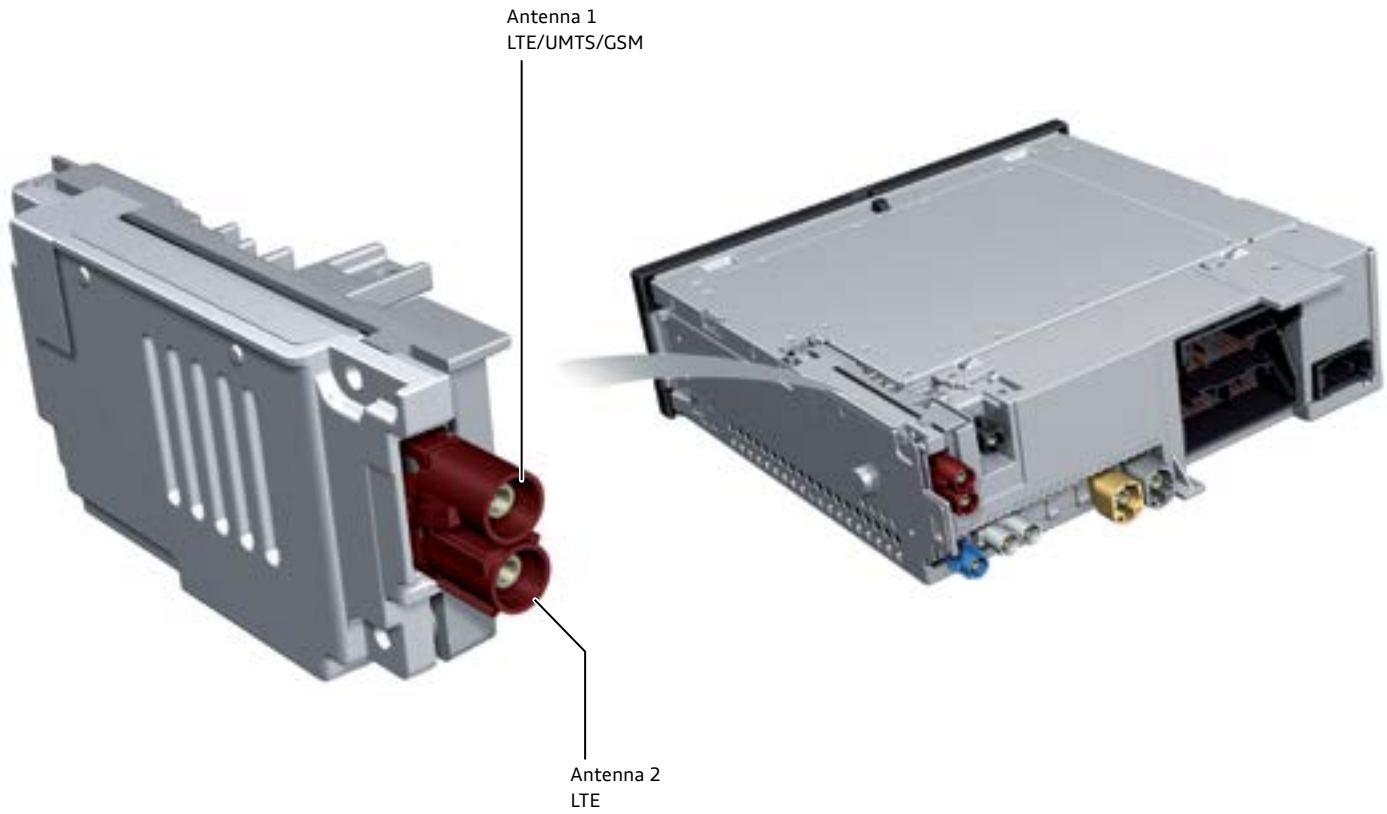
Today, download speeds of up to 100 Mbit /sec are possible. It the future rates as high as 2 Gbit /sec may be reached.

Basically, LTE technology is based on UMTS. Since high data rates are achieved with LTE, two independent reception antennas are necessary. These provide the two receivers in the LTE module with cell phone signals. The data processed by the two receivers is then combined and summarized into a single unit. Then the data is used for the appropriate application (Google Earth ™, data download via Wi-Fi hotspot, etc.).

Antennas

The LTE antenna 1 is designed as a transmitting and receiving antenna. It is also responsible for the operation in the UMTS/GSM network. LTE antenna 2 is only a receiver antenna for LTE.

When travelling in an area that has only a UMTS/GSM network available, LTE antenna 1 switches its role to receiving those signals. Once the vehicle is in an area where LTE coverage is available, LTE antenna 2 assumes the reception duties.



Information Electronics Control Module 1 J794 with LTE antennas. *625_129*

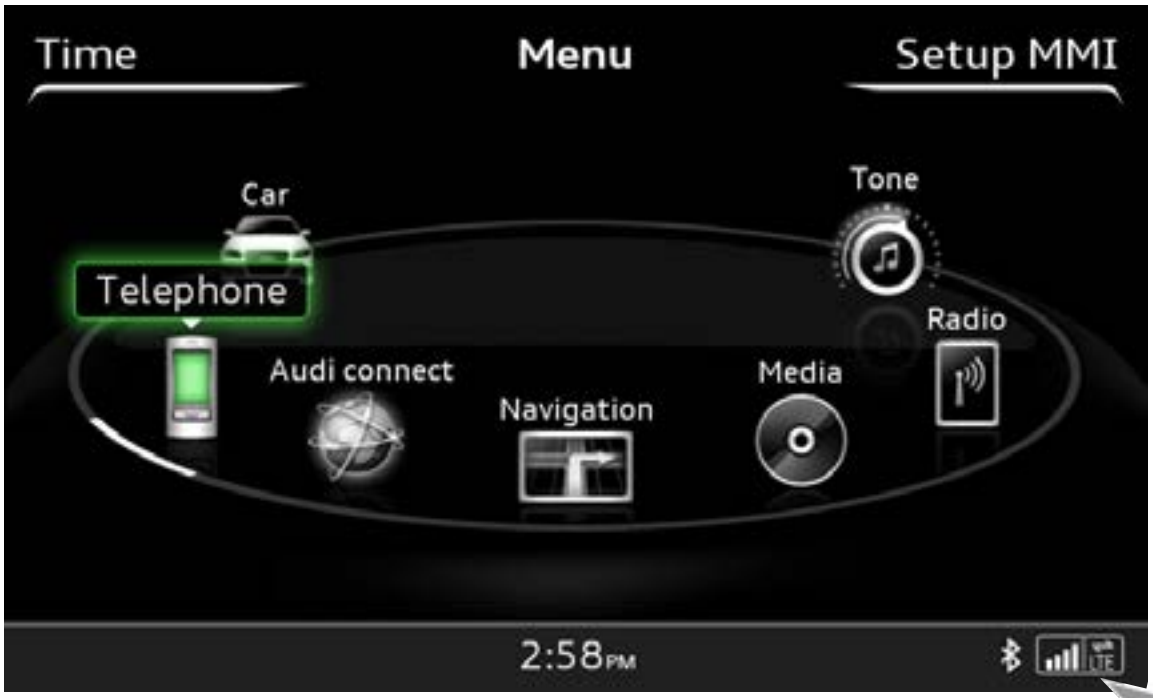
Note
The LTE module is used only for data receiving. To use a mobile phone it must be connected to J794 using the Hands Free Profile (HFP).

Reception indicator

The LTE data module can exchange data via the LTE as well as via the UMTS or GSM network.

The following displays of signal strength and the current network connectivity are shown:

- 2 G GSM network with EDGE (max 220 kbit / s)
- 3 G UMTS network with HSPA (up 7.2 Mbit / s)
- 4 G UMTS network with HSPA + (max. 21 Mbit / s)
- LTE 4 G LTE network (max. 100 Mbit / s)



618_074a

Diagnosis

If Antenna 1 fails, it is no longer possible to send or receive data.

In antenna 2 fails, the data rate in the LTE mode may be restricted.

Both antennas are monitored by Self-diagnosis. A DTC entry is made in the event of failures.

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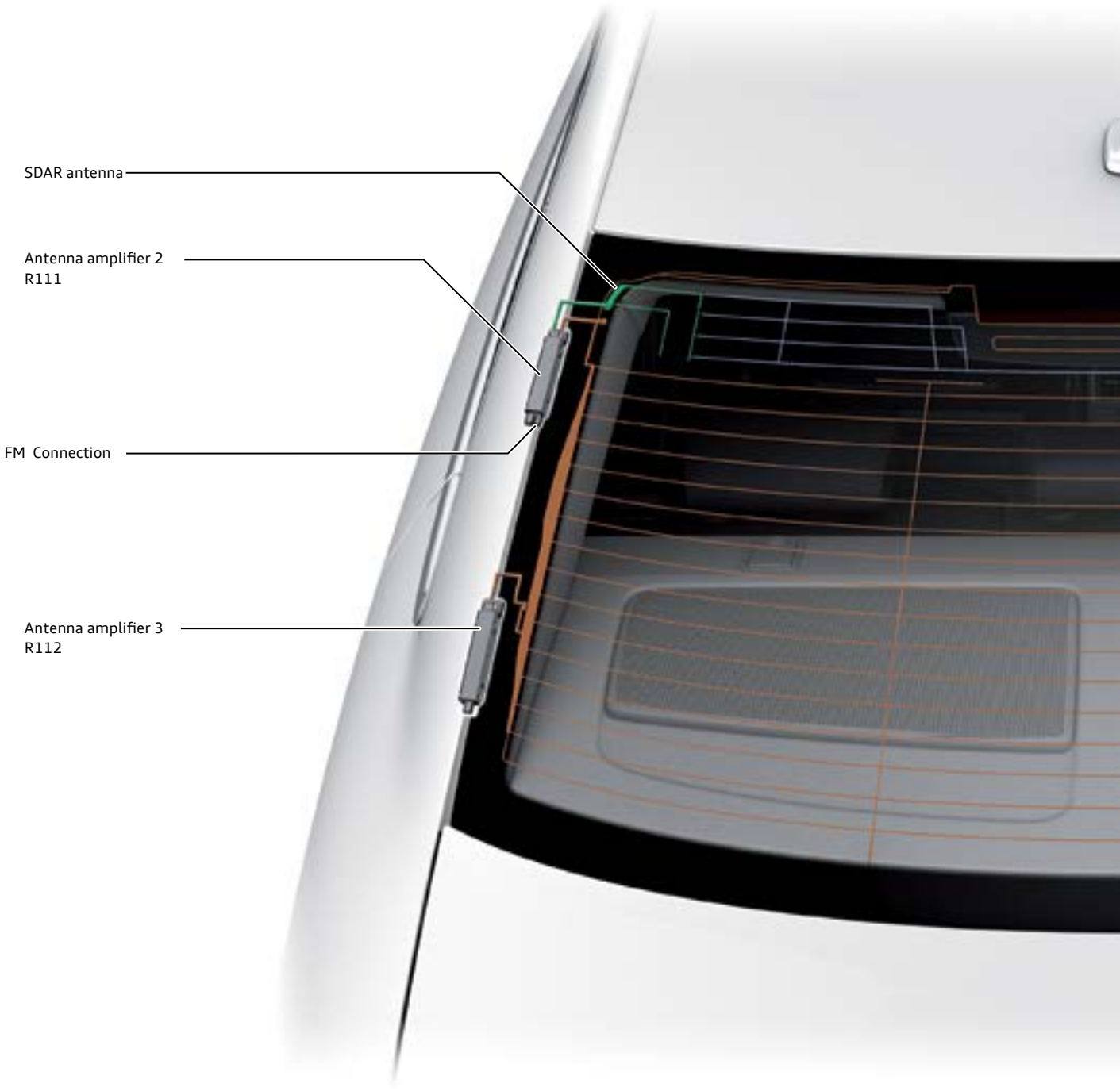
Notes

Antenna overview

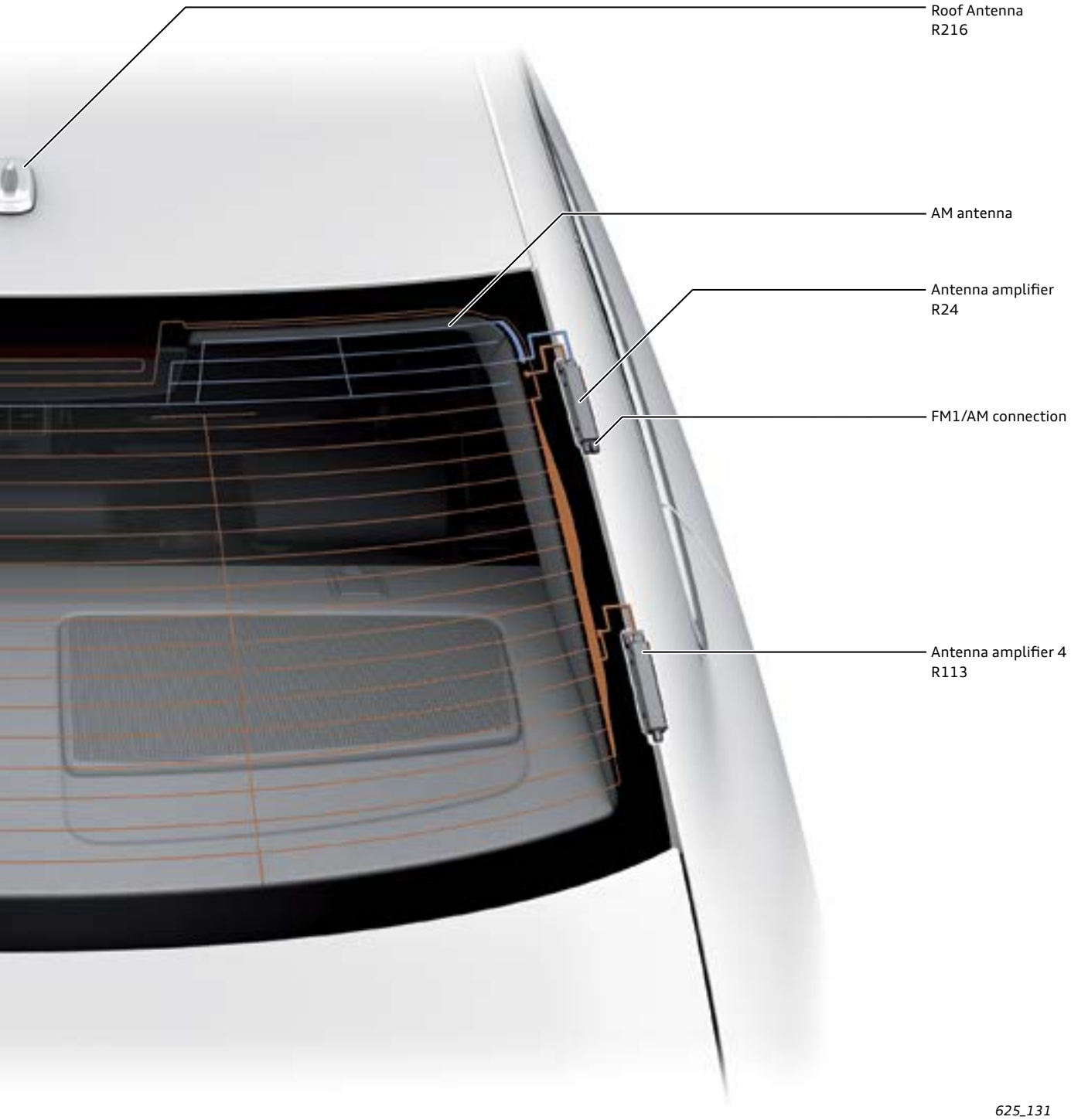
The aerials in the 2015 Audi A3 are distributed across the rear window and the roof aerial R216. The boosters for the aerials in the rear window and in the rear spoiler are mounted to the rear hatch.

The boosters for the antennas in the rear window are mounted under the C-pillar trim panel.



Roof aerial R216
(North America)

609_112



625_131

LTE antennas

The Audi's A3 sedan with Audi connect has two LTE antennas mounted on the inside of the rear bumper.

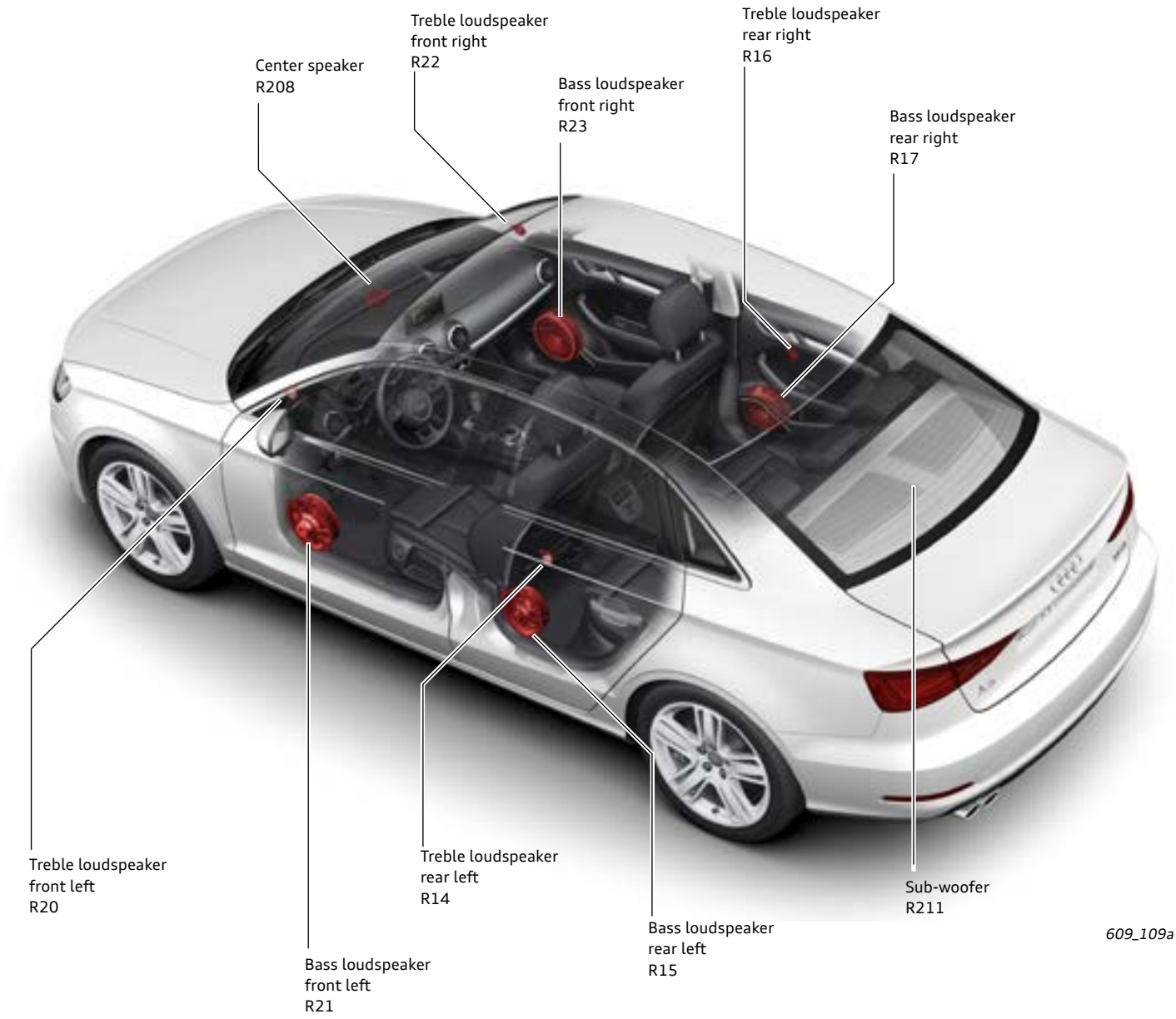

Information Electronics Control Module 1
J794
Roof Antenna
R216
GSM Antenna 2
R267
GSM Antenna
R205

625_132a

Sound systems

The Audi sound system is standard equipment for the 2015 A3 sedan. It features nine speakers and a hat-shelf mounted sub-woofer. The audio amplifier is integrated with Information Electronics Control Module J794 and has a total power output of 180 watts.

Audi sound system



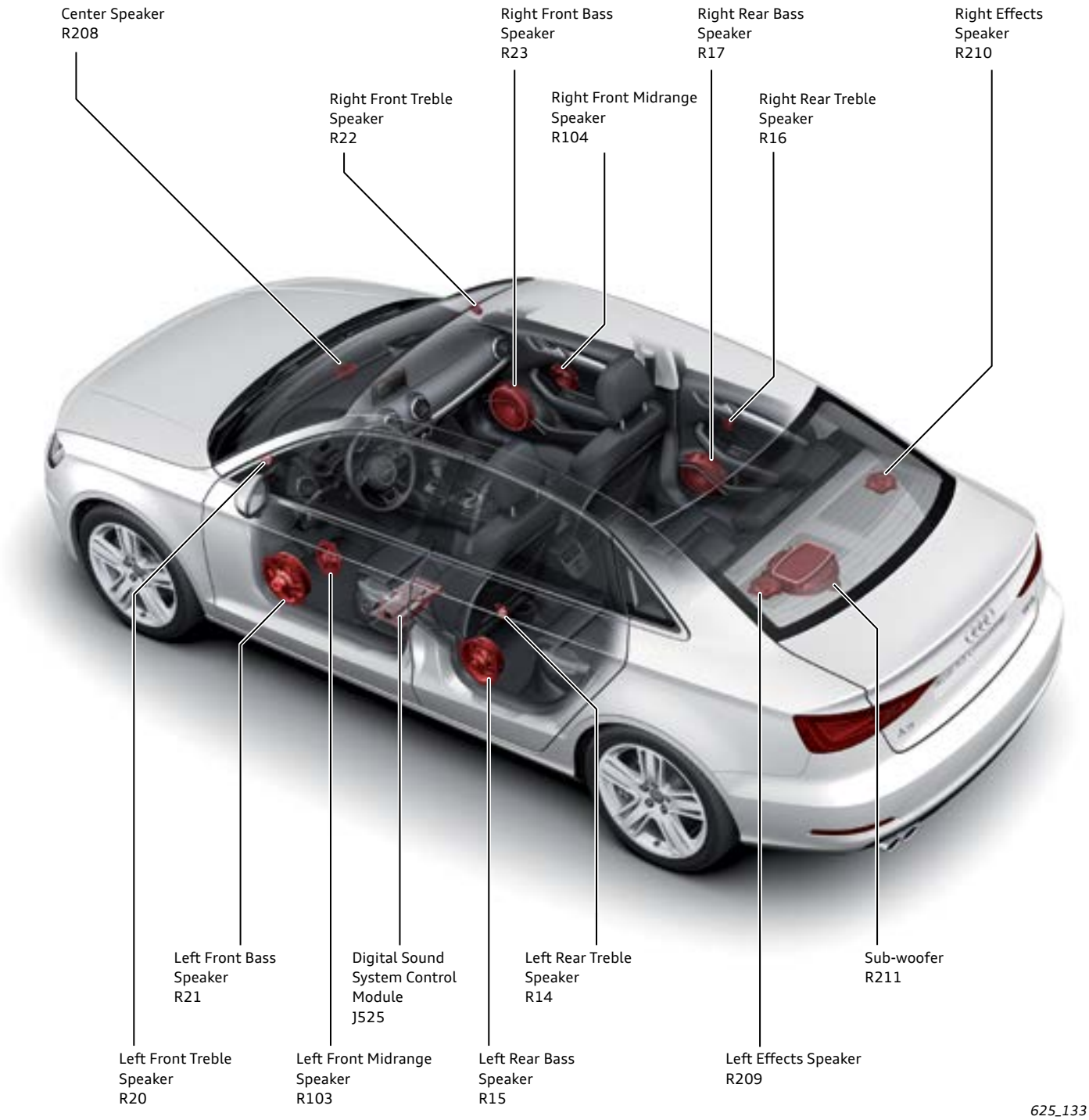
The optional Bang & Olufsen Sound System delivers a total power output of approximately 705 watts.

With its 5.1 Surround Sound speakers,it provides excellent sound quality. The external Bang & Olufsen audio amplifier (Digital Sound System Control Module J525) powers a total of 13 loudspeakers and the sub-woofer through its 15 channels. The sub-woofer is driven through two channels.

The external audio amplifier is installed under the left front seat. It is connected to Information Electronics Control Module J794 via the MOST bus. When the Bang & Olufsen system is installed, both bass front speakers in the doors are highlighted by indirect LED lighting controlled by the door control modules.

The subwoofer is located under the rear hat-shelf.

Audi A3 sedan with Bang & Olufsen Sound System



625_133

Service

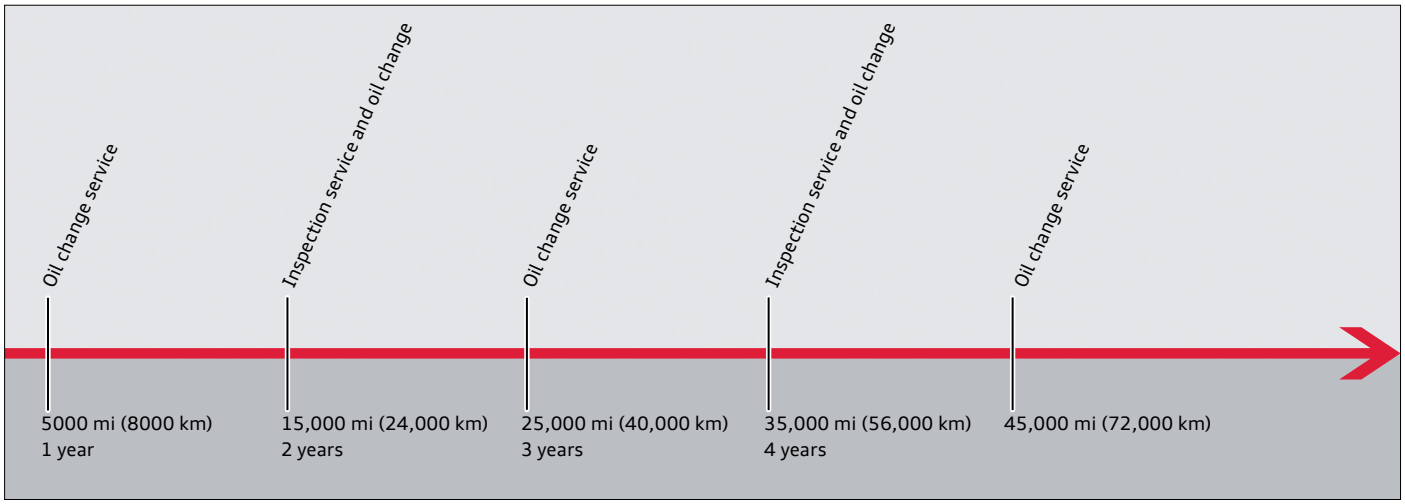
Service interval overview for North American region

Service recommendations can be viewed through the MMI.

- Oil change service
- Mileage based service events
- time based service events

625_073a

The first recommended oil change for A3 sedans in the North American region is at 5000 mi (8000 km) or at one year from the date of delivery. An oil change and inspection service is recommended at 15,000 mi (24,000 km) Oil change service is recommended 10,000 mi (16,000 km) thereafter with. See the chart below.



625_080

Special tools and workshop equipment

T10172 with T10172/11

609_159 609_160

Tensioning the timing belt

T10489

609_161

Disconnecting the high-pressure pump drive gear

T10491

609_163

Removing and installing the oxygen sensor

T10493

609_165

Installing the camshaft seal

T10503

609_151

For use with reversible ratchet attachment for bits VAS 6784

T10502

609_152

Installing the protective cap on the brake caliper housing

VAS 6748

609_178

Removing and installing the Airbag Control Module, in combination with T10503

VAS 6338/38

609_179

Flushing the air conditioner refrigerant system

T10383

625_144

Removing the selector lever and/or selector indicator gasket

VAS 6416

625_143

Removing the center console trim

T10490

625_140

Crankshaft lock. Used on 1.8L and 2.0L EA88 third generation engines.

T10501

625_142

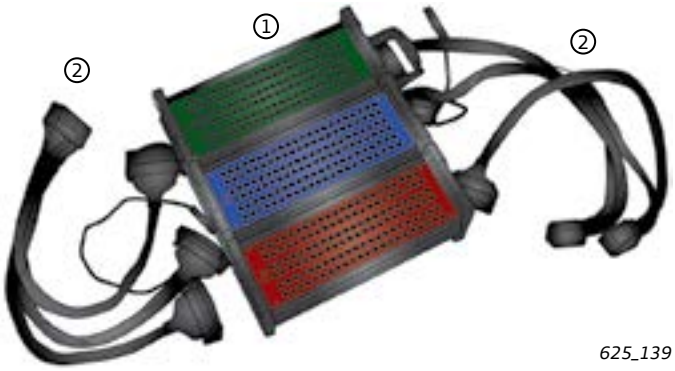
Turbocharger removal and installation

T10492

625_141

Locking pins. Used to lock the high pressure pump during removal/installation on second generation 2.0L TDI engine.

VAS 6606 bridge, 198 pin -1-
VAS 6606/10 Test adapter -2-

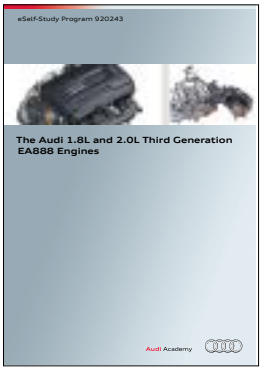


625_139

For diagnosing control modules with 198 pin connectors (UDS control modules)

Notes

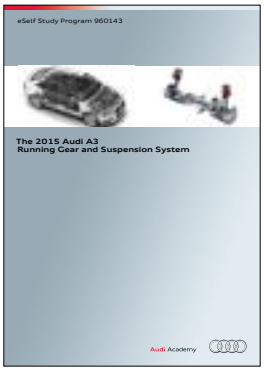
Self Study Program



SSP 920243
Audi 1.8L and 2.0L Third Generation EA888 Engines

SSP 970343
The 2015 Audi A3 Vehicle Electronics and Drivers Assistance Systems

SSP 970143
Modular Infotainment Platform (MIB)



SSP 960143
The 2015 Audi A3 Running Gear and Suspension Systems

SSP 970243
The 2015 Audi A3 Onboard Power Supply and Networking Systems

SSP 920143
The Audi 2.0L Third Generation TDI Engine

Knowledge Assessment

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

The Knowledge Assessment is required for Certification.

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

From the **accessaudi.com** Homepage:

- Click on the "ACADEMY" tab
- Click on the "Academy site" link
- Click on the Course Catalog Search and select "990143 - Audi A3 Introduction"

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

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

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990143

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