



The 2016 Audi A3 Sportback e-tron

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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 Sportback e-tron is a plug-in hybrid engineered to provide a fully integrated e-mobility solution.

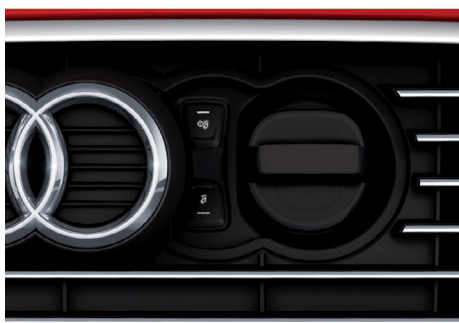
There is no need for drivers to change their driving habits because the Audi A3 Sportback e-tron is designed to allow simple use of e-mobility.

It has an all-electric driving range of 16 to 19 mi (25 to 30 km) and is driven by a 102 hp (75 kW) electric motor with a top speed of 80 mph (130 km/h). At high speeds and under heavy acceleration, the internal combustion engine is automatically activated to provide additional power.

The Audi A3 Sportback e-tron brings together the best of both worlds - an electric motor for emission-free driving and an economical internal combustion engine for long range.

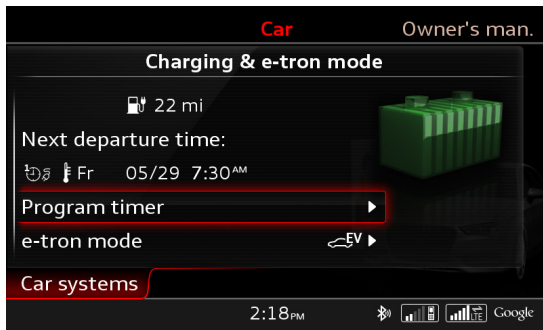
It combines both driving enjoyment and environmental awareness.

A3 e-tron



Vehicle distinguishing features

MMI system with e-tron displays



e-tron logo on the instrument panel (front passenger side)
(European version shown)



Switch for EV mode



e-tron logo on the design cover in the engine compartment



e-tron specific single-frame radiator grille in chrome/
matte black



e-tron specific front bumper with two aluminum-look
surrounds on the air intake covers



e-tron logo on the front fenders



e-tron logo on the selector lever



Instrument cluster with power meter and e-tron displays



e-tron logo on the rear deck lid



e-tron specific rear bumper with diffuser, aluminum-look surrounds and concealed exhaust pipes



Various e-tron light alloy wheels available. See the Product Information Book for complete details.

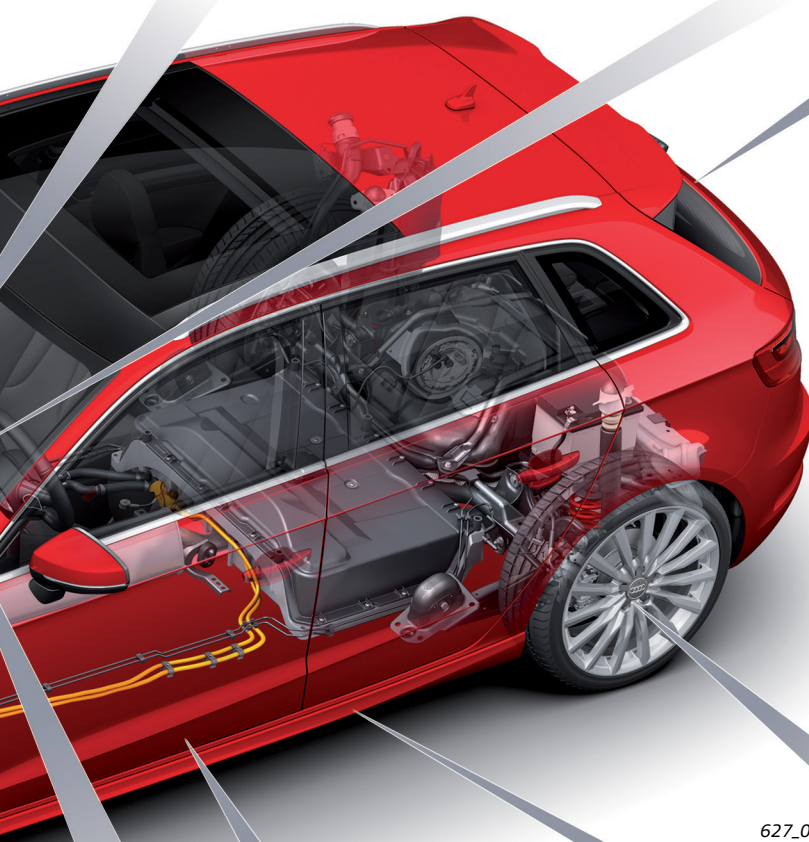


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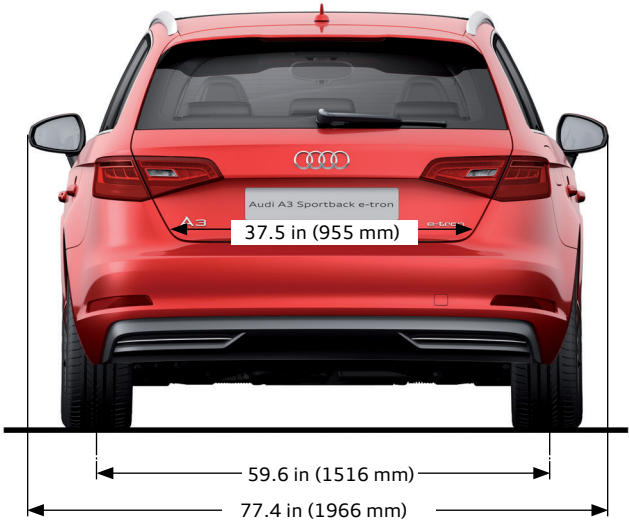
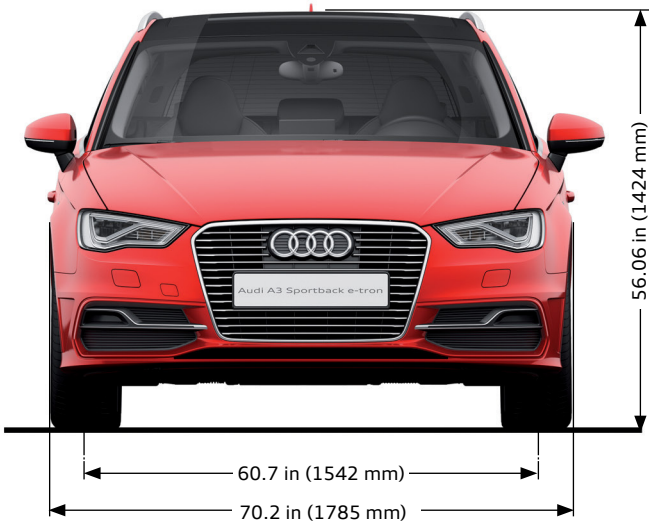
e-tron logo on the door sills



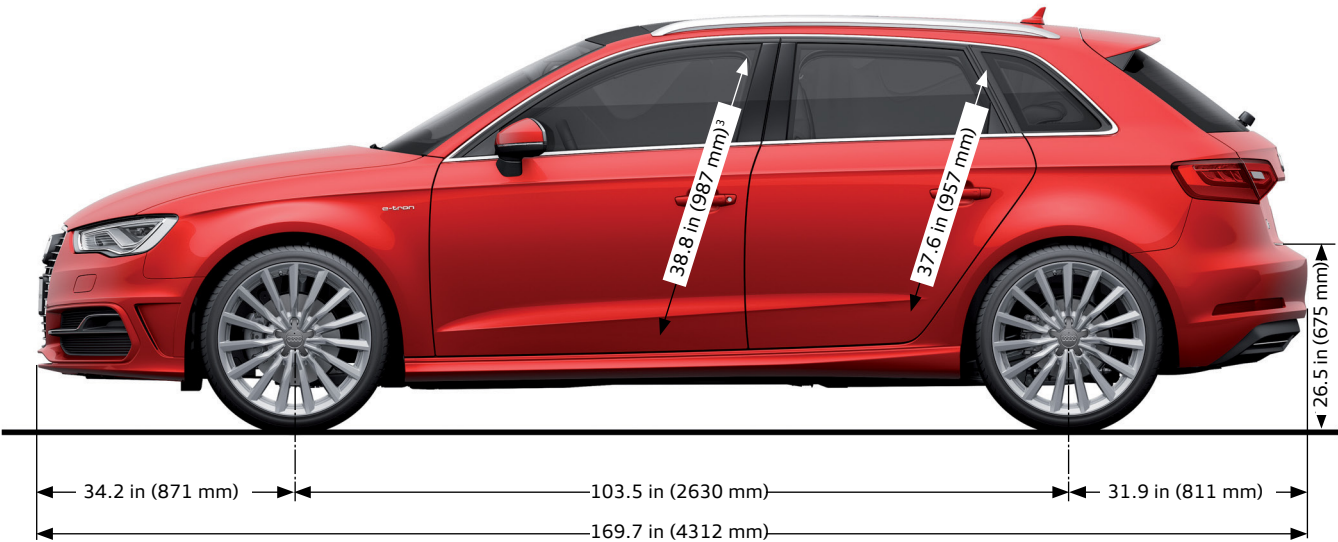
S line sills



Dimensions



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627_021



627_022

Interior dimensions

Front cabin width	54.8 in(1392 mm) ¹⁾ 57.2 in (1453 mm) ²⁾
Rear cabin width	52.9 in (1344 mm) ¹⁾ 55.9 in (1422 mm) ²⁾
Front headroom	38.8 in (987 mm) ³⁾
Rear headroom	37.6 in (957 mm)
Through-loading width	39.3 in (1000 mm)
Load sill height	26.5 in (675 mm)
Trunk capacity	13.6 cu ft (385 l) ⁴⁾ 43 cu ft (1220 l) ⁴⁾

Exterior dimensions and weights

Length	169.7 in (4312 mm)
Width	70.2 in (1785 mm) ⁵⁾
Width	77.4 in (1966 mm) ⁶⁾
Height	56.06 in (1424 mm)
Front track width	60.7 in (1542 mm)
Rear track width	59.6 in (1516 mm)
Wheelbase	103.5 in (2630 mm)
Curb weight	3395 lb (1540 kg)
Gross vehicle weight	4519 lb (2050 kg)

Other specifications

Concept	Plug-in hybrid (PHEV)
Battery type	Lithium-ion system
Total capacity in kWh	8.8
Top speed in electric-only mode	80 mph (130km/h)
Top speed	138 mph (222km/h)
Acceleration 0 - 37 mph (0 - 60 km/h) in electric-only mode in s	4.9 seconds
Acceleration 0 - 60 mph (0 - 100 km/h) kph	7.6 seconds
Range (electric drive only)	up to 31 m (50 km)
Total range	up to 584 m (940 km)
Drag coefficient c_w	0.32
Capacity of fuel tank	10.5 gal (40 l)

¹⁾ Shoulder room width

²⁾ Elbow room width

³⁾ Maximum headroom

⁴⁾ With rear backrest folded down

⁵⁾ Excluding mirror

⁶⁾ Including mirror

All dimensions are based on the unladen weight of the vehicle.

Electrical Safety

High Voltage System

The high voltage electrical systems in hybrid vehicles can be very dangerous if not handled correctly. Risk of injury and potential death is present if the following restrictions and procedures are not followed closely.

Dealership Roles

Each role within the dealership has an obligation to know the safety precautions necessary when dealing with high voltage vehicles. It is extremely important that each role knows and observes the following guidelines.

High Voltage Technician

- ▶ Trained Technician who has been certified to perform maintenance and repairs on high voltage vehicles
- ▶ May de-energize and energize high voltage vehicles
- ▶ May diagnose high voltage issues and concerns
- ▶ May authorize other (trained and certified) technicians to perform maintenance or repairs on non-electrical systems of high voltage vehicles
- ▶ Affixes warning labels to any high voltage vehicle being worked on
- ▶ Instructs and supervises Hybrid Aware Technicians
- ▶ Is responsible to alert all employees whenever there is a vehicle that has been energized or de-energized
- ▶ Is ultimately responsible for all repairs of high voltage vehicles

Emergency Situations

Do not make a second victim

- ▶ Do not touch anyone who is in contact with the high voltage vehicle
- ▶ If certified, attempt to turn off the high voltage system without risk of personal injury
- ▶ Attempt to Separate the person in contact with the high voltage system using a non-conductive object
- ▶ If an injured employee is not responsive
- ▶ Check vital signs (pulse and breathing)
- ▶ Call 911
- ▶ Perform CPR (lung and heart massage)
- ▶ Use defibrillator if equipped and trained

All high-voltage lines in the high-voltage system are color-coded orange for identification. Due to the high voltages and currents involved, the electrical lines have a significantly larger cross-section

Hybrid Aware Technician

- ▶ Trained Technician who has been certified to perform maintenance and repairs on high voltage vehicles
- ▶ May only work on non-electrical systems

Hybrid Aware Service Consultant

- ▶ Can determine if a vehicle will require diagnosis or repairs to any part of the high voltage system by correctly identifying the hybrid warning icon
- ▶ Correctly identify the high voltage vehicle and document on the repair order

Sales Consultant / F&I / Administration

- ▶ Must be aware of the possible hazards of high voltage vehicles and what to do in the case of an emergency
- ▶ Must know and understand the importance of safety when working with high voltage vehicles.



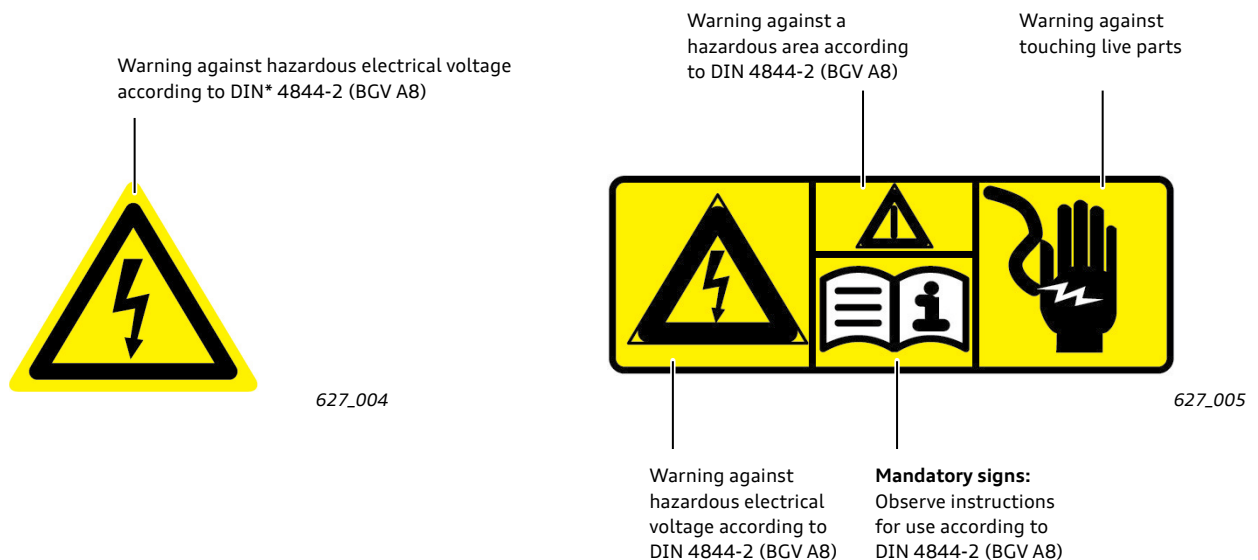
Warning signs

To minimize the risk associated with the high voltage system for users, service and repair shop personnel, as well as for technical and medical emergency responders, there are several warning and information labels attached to the Audi A3 Sportback e-tron.

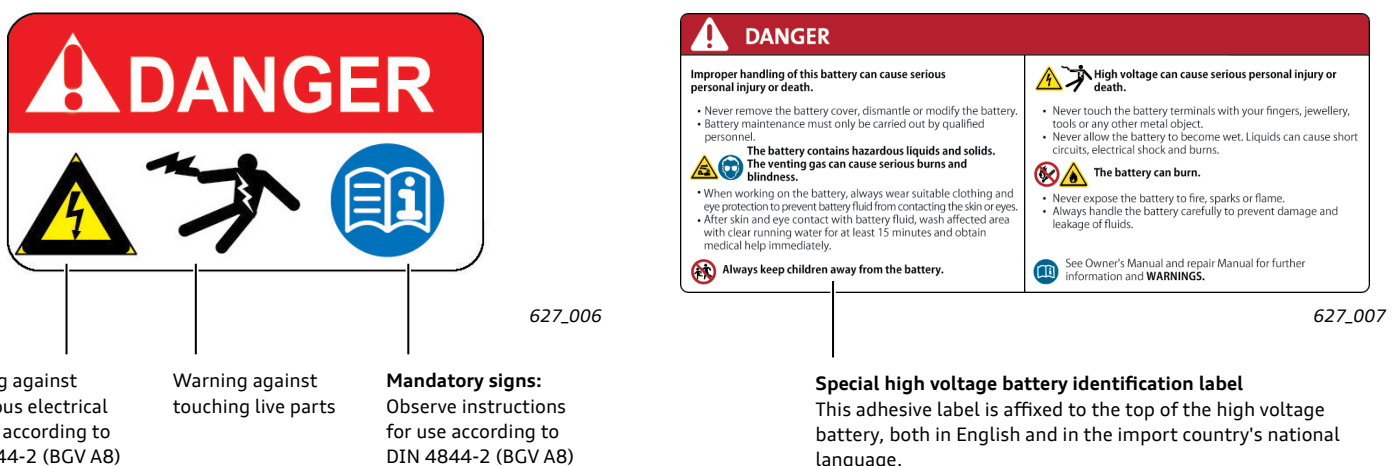
The following yellow warning labels are used to identify high voltage conducting components or high voltage components installed in the immediate vicinity or, for example, hazardous components concealed by covers.

Basically, two types of warning label are used:

- ▶ Yellow warning label with warning symbol for electrical voltage.
- ▶ Warning label marked "Danger" against a red background.



The warning labels marked "Danger" identify high voltage components or high voltage conducting components.



*DIN - Deutsches Institut für Normung. A standards defining organization. Similar in function to the SAE.

Battery Regulation

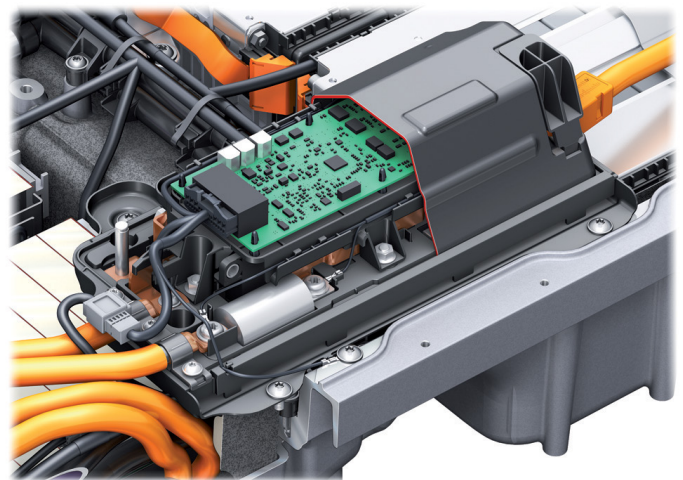
The High Voltage system in the A3 e-tron is shut down and electrically isolated if any of the following conditions are met:

- ▶ Terminal 15 switched off.
- ▶ A crash signal from the Airbag Control Module is detected.
- ▶ Maintenance connector TW is opened.
- ▶ Fuse for power supply to power contactors terminal 30c is disconnected.
- ▶ 12 volt power supply for the Hybrid Battery Unit is interrupted.
- ▶ Safety line open.

Safety line

The safety line is a 12 volt ring wire which interconnects all high voltage components in series. The Battery Regulation Control Module inputs an electrical current of approximately 10 mA into the safety line and evaluates the current flow. In addition, the Electrical Drive Control Module monitors the safety line.

If the safety line is broken, the high voltage system is immediately deactivated by the Battery Regulation Control Module. The high voltage contacts are opened. The driver is notified via the display in the instrument cluster.



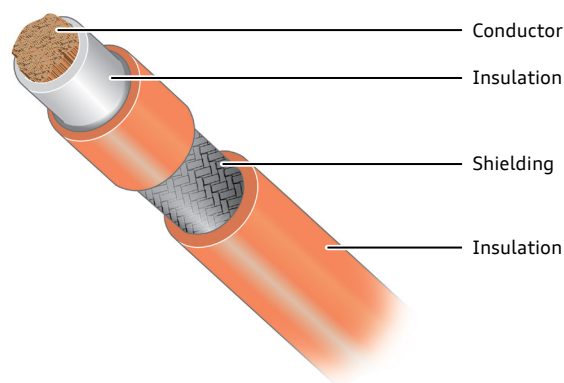
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High voltage lines

All high voltage lines in the high voltage system are color-coded orange for identification. Due to the high voltages and currents involved, the electrical lines have a significantly larger cross-section and are connected by special plug-in contacts. The electrical lines of the high voltage system differ from the other lines in the 12-volt electrical system in terms of their core design.

The high voltage lines may also have a corrugated plastic tube to provide protection against chafing. Three different types of high voltage line are used in the high voltage system: single-pole and 2-pole lines with and without a safety line.

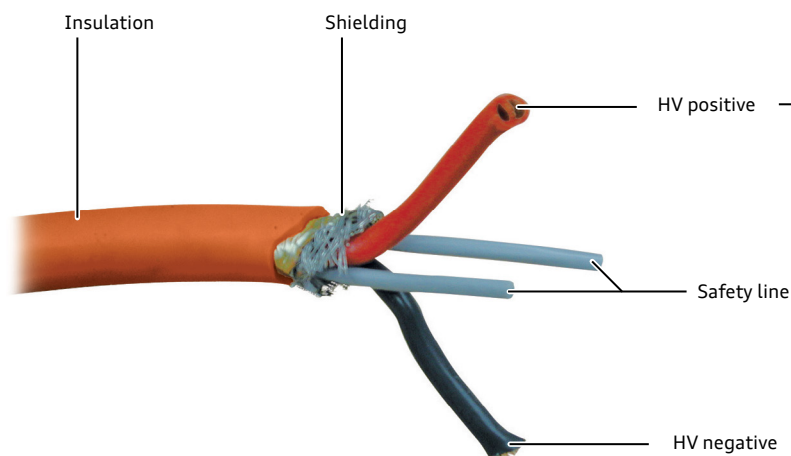
Single-pole high voltage line



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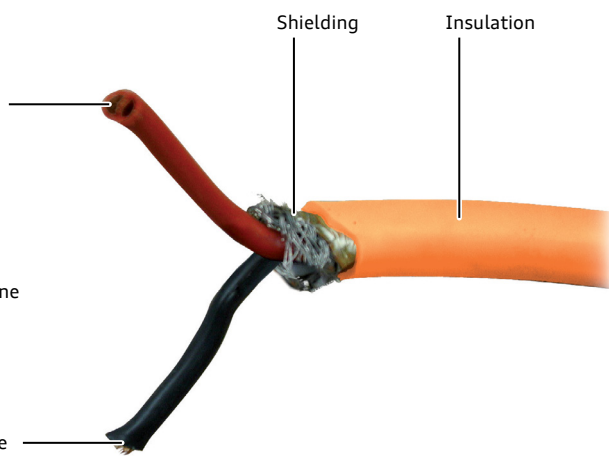
2-pole high voltage line

With safety line



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Without safety line



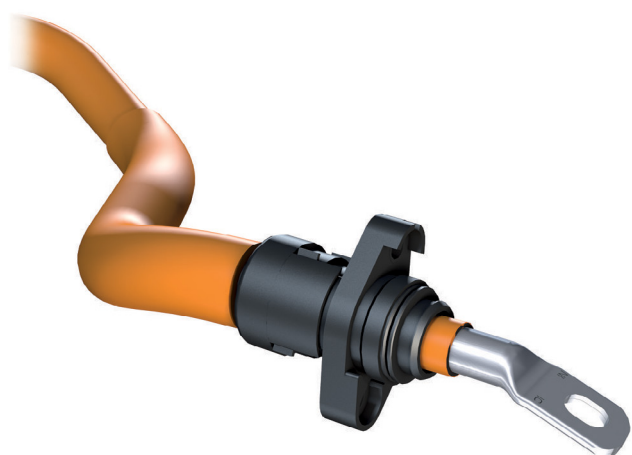
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High voltage connections

The high voltage lines on the Audi A3 Sportback e-tron are bolted onto or plugged into the high voltage components.

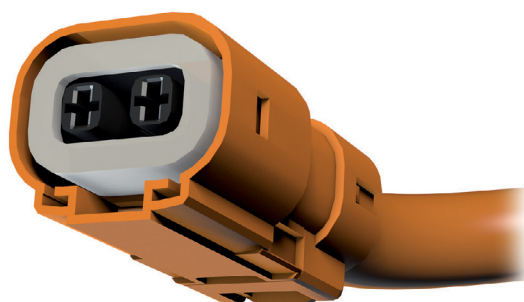
To avoid incorrect assembly, all connections are mechanically encoded.

Bolted connection



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2-pole plug connection



627_056

High Voltage System Maintenance Connector

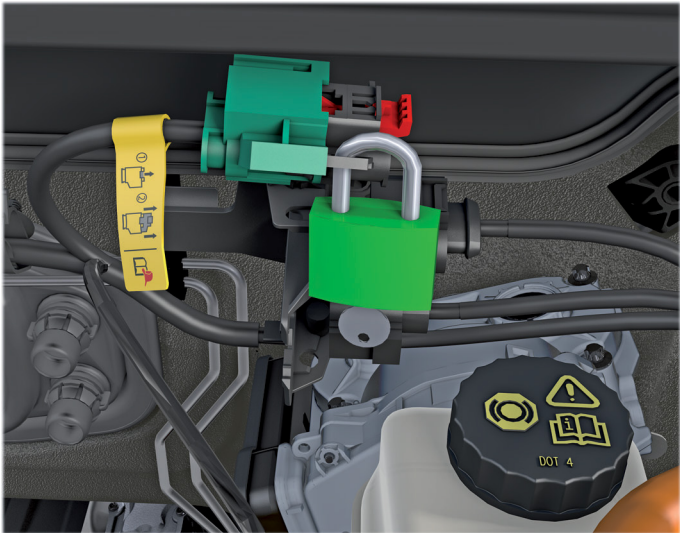
The High Voltage Electrical System Maintenance Connector is located in the engine compartment. It serves as an electrical connection in the 12 volt control circuit for the high voltage battery contacts and as a component part of the safety line.

Opening the High-voltage Electrical System Maintenance Connector opens the safety line and breaks the 12 volt control circuit of the high voltage power contacts, this serves to de-energize the high voltage system.

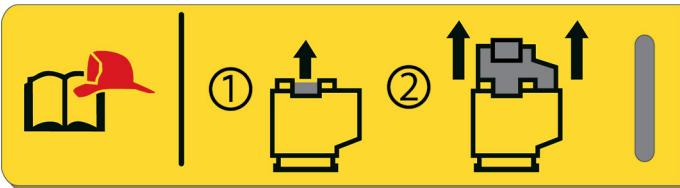
The VAS Scan Tool must be used to properly de-energize the high voltage system. After the High-voltage Electrical System Maintenance Connector is opened, it must be secured with padlock (special part number T40262/1) to prevent it from being accidentally reconnected.

In the engine compartment

The maintenance connector is labelled.



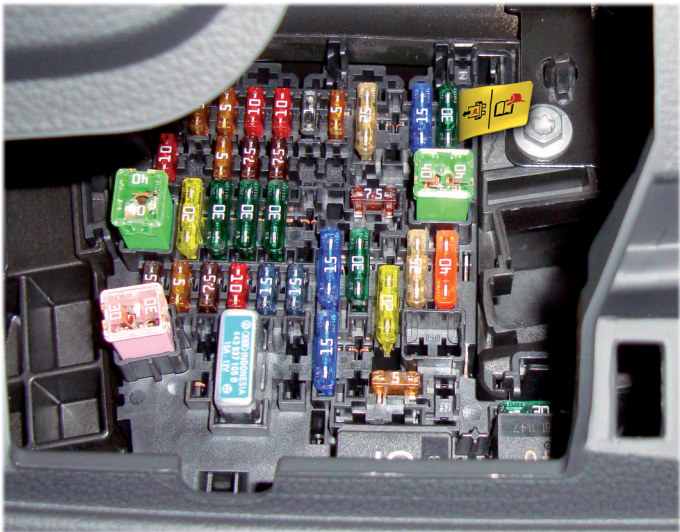
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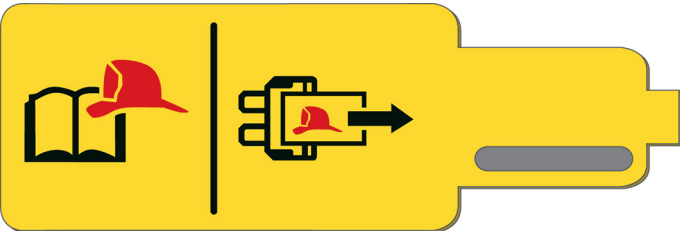
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Fuse panel in passenger compartment

The power supply fuse for the control circuit of the power contacts is labelled. This fuse is to be utilized by first responders in an emergency situation.



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Information

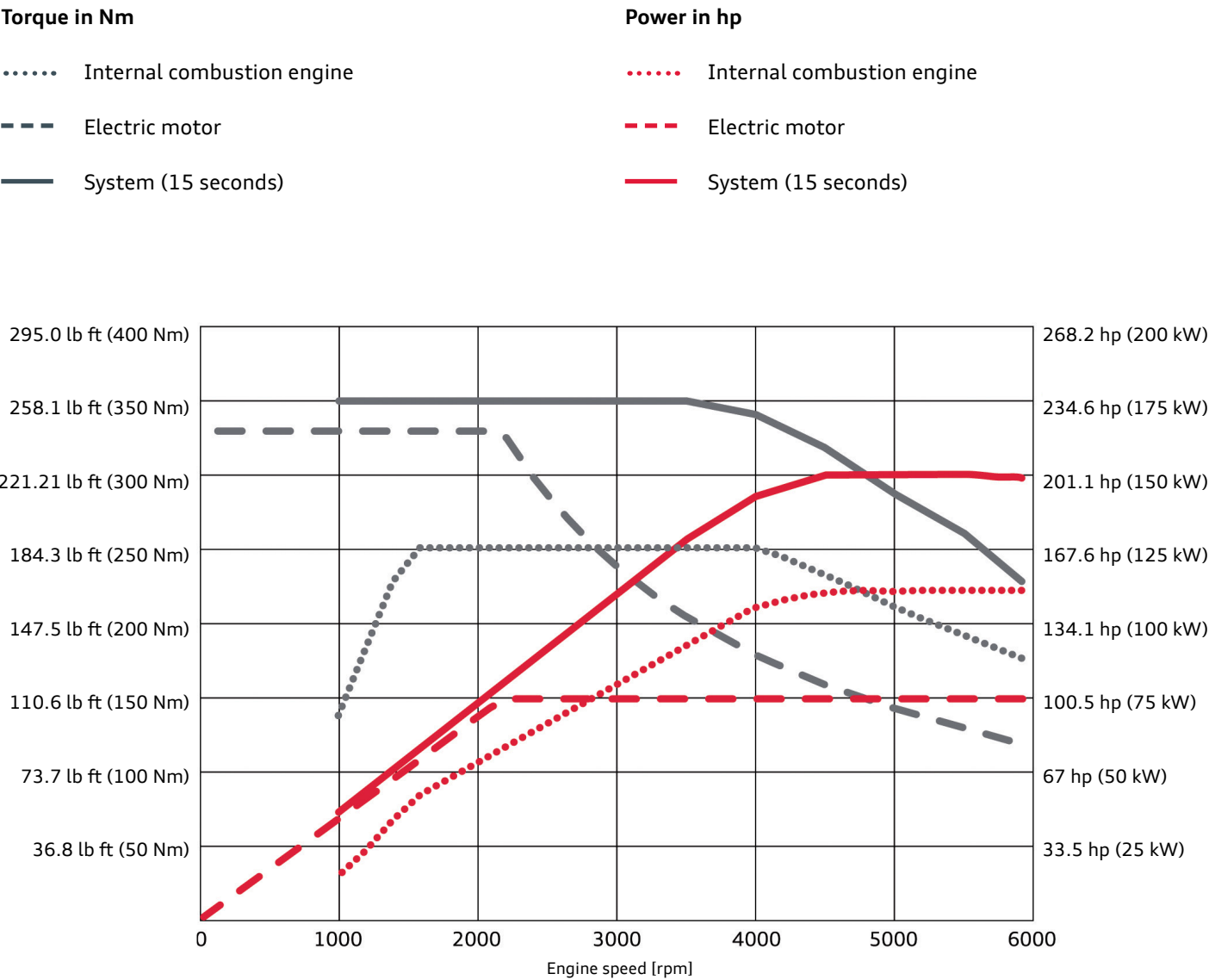
After de-energizing the system, a check must be made to ensure that no voltage is present by running the relevant Test Plan in ODIS Service.

Drive unit

Specifications

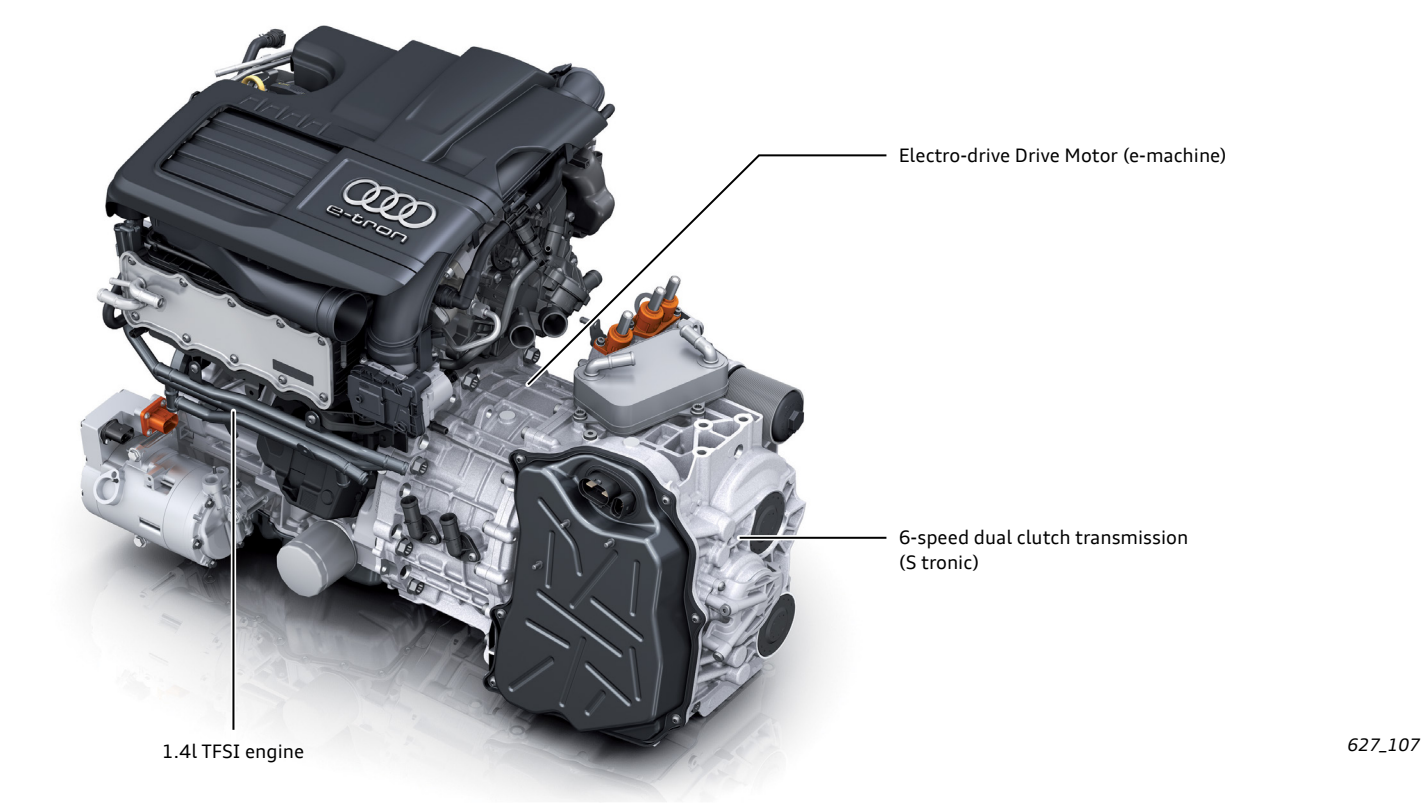
Torque-power curve

EA211 series 1.4l TFSI engine CUKB



627_093

Internal combustion engine and e-machine with transmission



Features	Specifications
Engine code	CUKB
Type	Four-cylinder in-line engine
Internal combustion engine output	150 hp (110 kW) at 5000 - 6000 rpm
Electric motor output	102 hp (75 kW) at 2000 - 2300 rpm
System output	150 kW
Torque of internal combustion engine	184 lb ft (250 Nm) at 1600 - 3500 rpm
Electric motor torque	243 lb ft (330 Nm) at 2200 rpm
System torque	258 lb ft (350 Nm)
Displacement in cm ³	1395
Stroke	3.1 in (80 mm)
Bore	2.9 in (74.5 mm)
Number of valves per cylinder	4
Firing order	1-3-4-2
Compression ratio	10 : 1
Fuel type	Premium 91 AKI
Turbocharging	Exhaust turbocharger
Engine management system	Bosch MED 17.01.21
Powertrain type	6-speed dual clutch transmission (S tronic)
Oxygen sensor control	1 sensor upstream of catalytic converter and 1 sensor downstream of catalytic converter
Mixture formation	Direct injection
Emission standard	SULEV 30

Internal combustion engine

The A3 Sportback e-tron uses the series 1.4l engine. Because the transmission is 2.26 in (57.5 mm) longer to accommodate the e-machine, the engine is mounted further to the right than in the standard A3 Sportback.

The main bearings, the connecting rod big end bearings and the piston rings of this engine have special coatings. In addition, piston backlash has been adapted and the cylinder liners are plasma-coated.

The Audi A3 Sportback e-tron can be driven in electric-only mode. This can result in periods of time during which the internal combustion engine is not in use.

During electric-only driving, the internal combustion engine can start in order to heat up the catalytic converter.

To ensure wear-free starting of the internal combustion engine after electric-only operation, clutch K0 closes and the e-machine turns the engine over until sufficient oil pressure is obtained.

In the U.S. market, the engine is also equipped with secondary air injection.



627_023

Engine start

The internal combustion engine is started by the e-machine. The engine Control Module sends a start message to the Transmission Mechatronic Module. Clutch K0 is closed and connects the e-machine rotor to the internal combustion engine's crankshaft. The rotor brings the engine's crankshaft up to starting speed. The engine control module then enables the ignition and fuel injection and the engine starts.

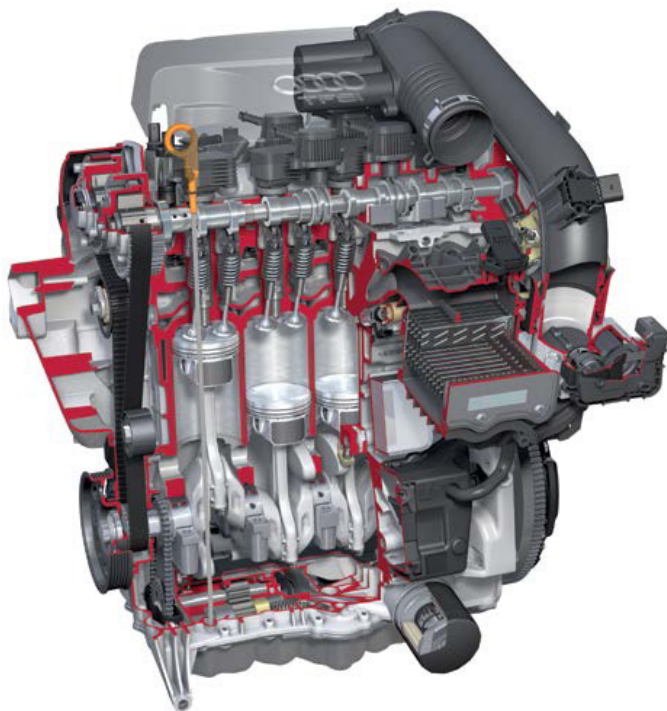
If it is necessary for the internal combustion engine to start when the vehicle is running in electric-only mode, the torque from the e-machine is increased by the amount necessary to start the internal combustion engine when the clutch closes. This prevents judder. After starting, clutch K0 is opened and the internal combustion engine runs at no load. After the speed of the internal combustion engine has been adapted to that of the e-machine, clutch K0 is closed again.

Brief technical description

- ▶ Four-cylinder in-line engine.
- ▶ Four valves per cylinder, double overhead camshafts (DOHC).
- ▶ FSI direct injection.
- ▶ Cast aluminium cylinder block.
- ▶ Turbocharger with indirect intercooler.
- ▶ Intercooler integrated in intake manifold (air/coolant heat exchanger).
- ▶ Belt driven camshafts.
- ▶ Emission control system with ceramic catalytic converter and converter heating function using two-stage injection (homogeneity split).

1.4l TFSI engine

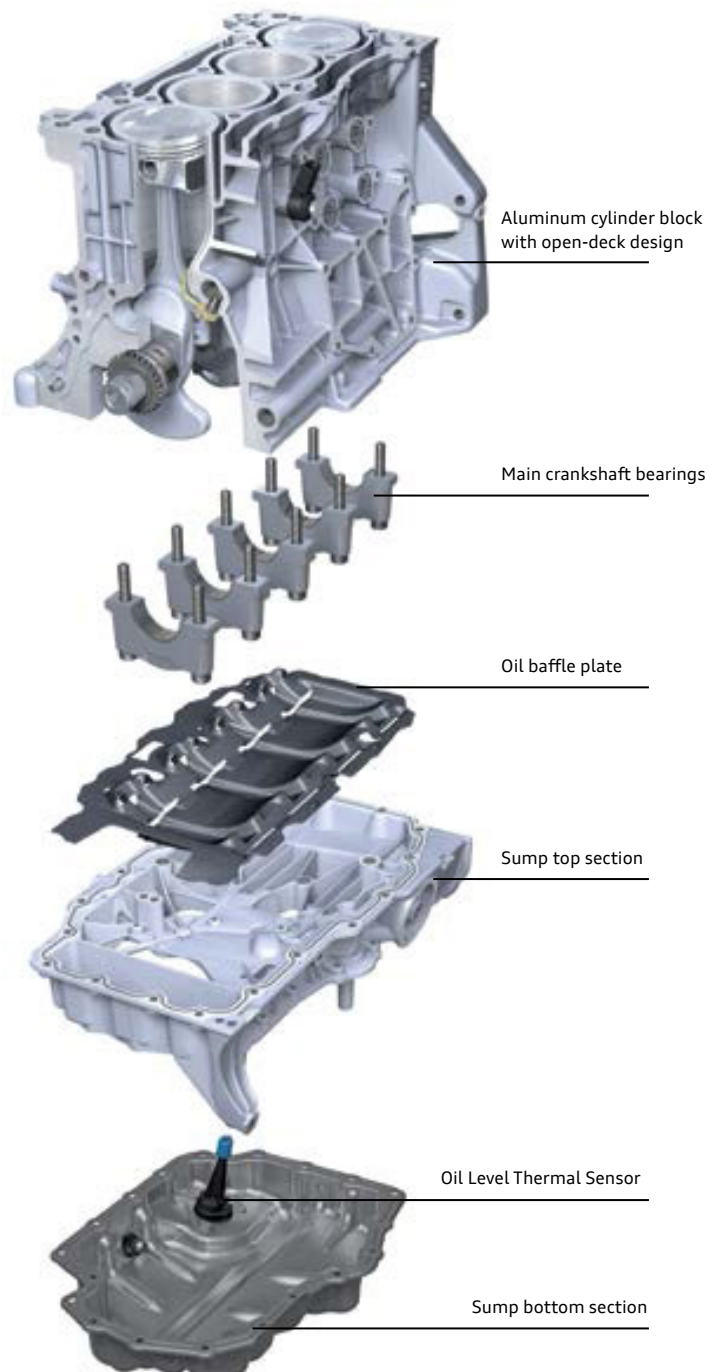
(Engine with cylinder selective shut-down shown)



Cylinder block

The cylinder block is made of die-cast aluminum and is an open-deck design. The advantages and disadvantages of an open-deck design are:

- ▶ It is easier and more economical to manufacture from the point of view of casting technology.
- ▶ More efficient cooling of the upper, (and hotter) part of the cylinders compared with a closed-deck design



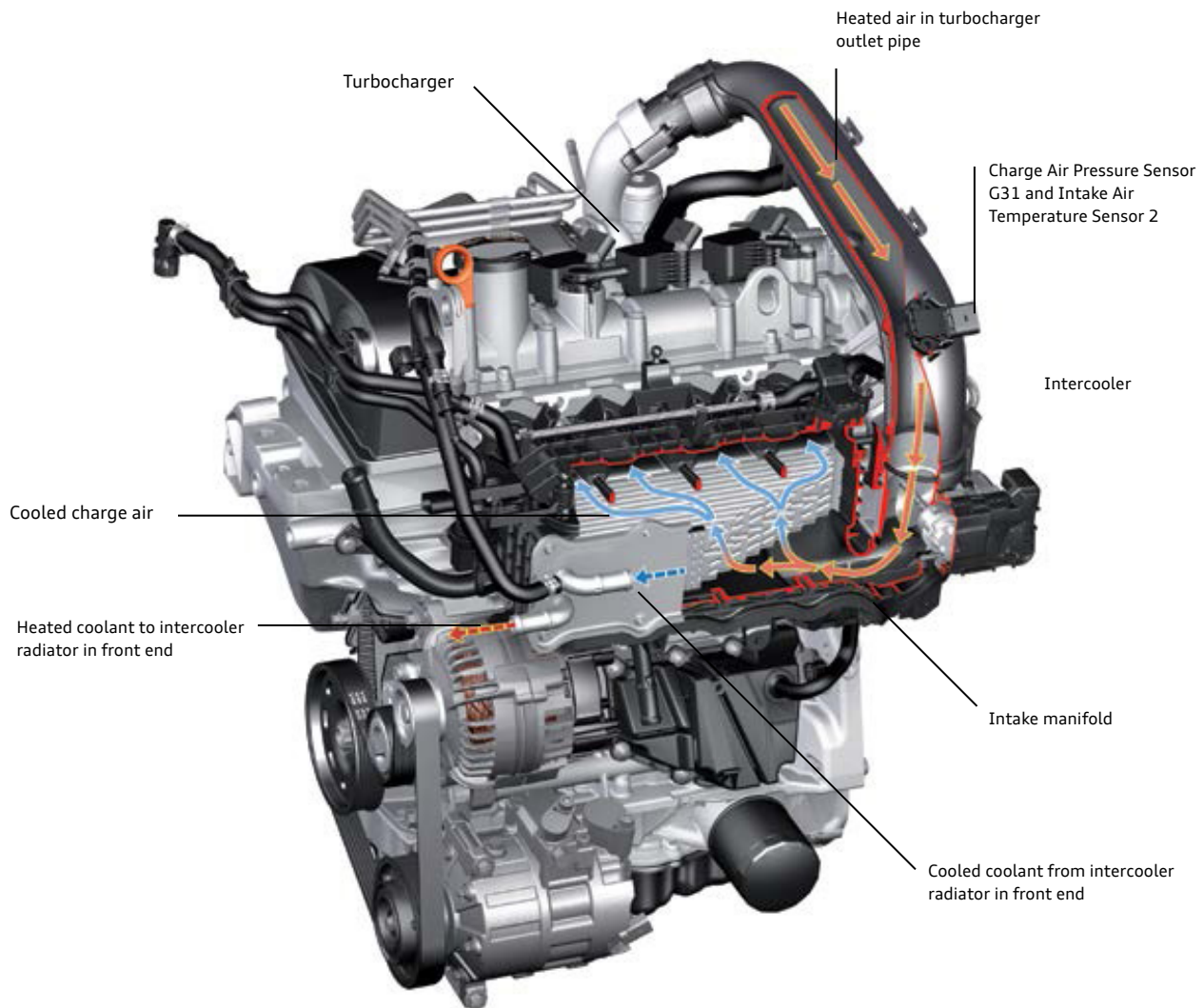
Intercooler

After the intake air has passed through the turbocharger, it is very hot. It is heated up to temperatures as high as 392 °F (200 °C)., mainly due to the compression process, but also because the turbocharger itself is very hot.

To cool the air from the turbocharger, it is passed through an intercooler, which is integrated in the intake manifold module.

The intercooler is an air/coolant heat exchanger and incorporated in the engine's coolant circulation system.

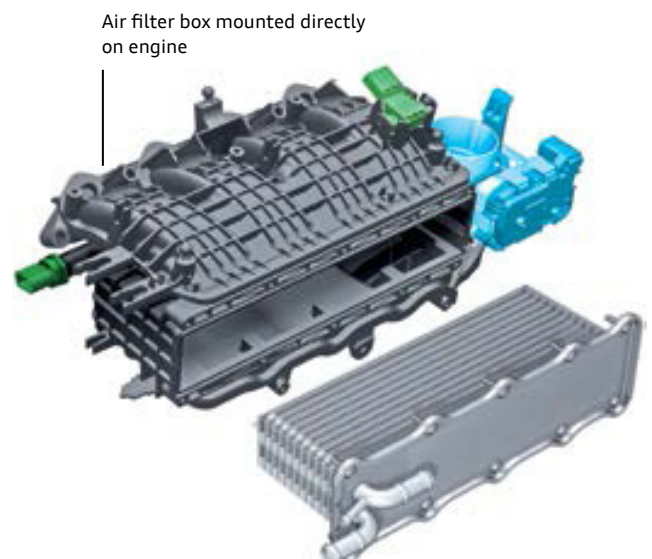
The hot air flows over the fins and the heat of the air is passed to the fins. The fins transfer the heat to the coolant. The heated coolant is pumped to the intercooler system's auxiliary radiator where it is cooled down again.



Air Intake

The air intake system is on the forward facing side of the engine. The air filter box is mounted directly on the engine.

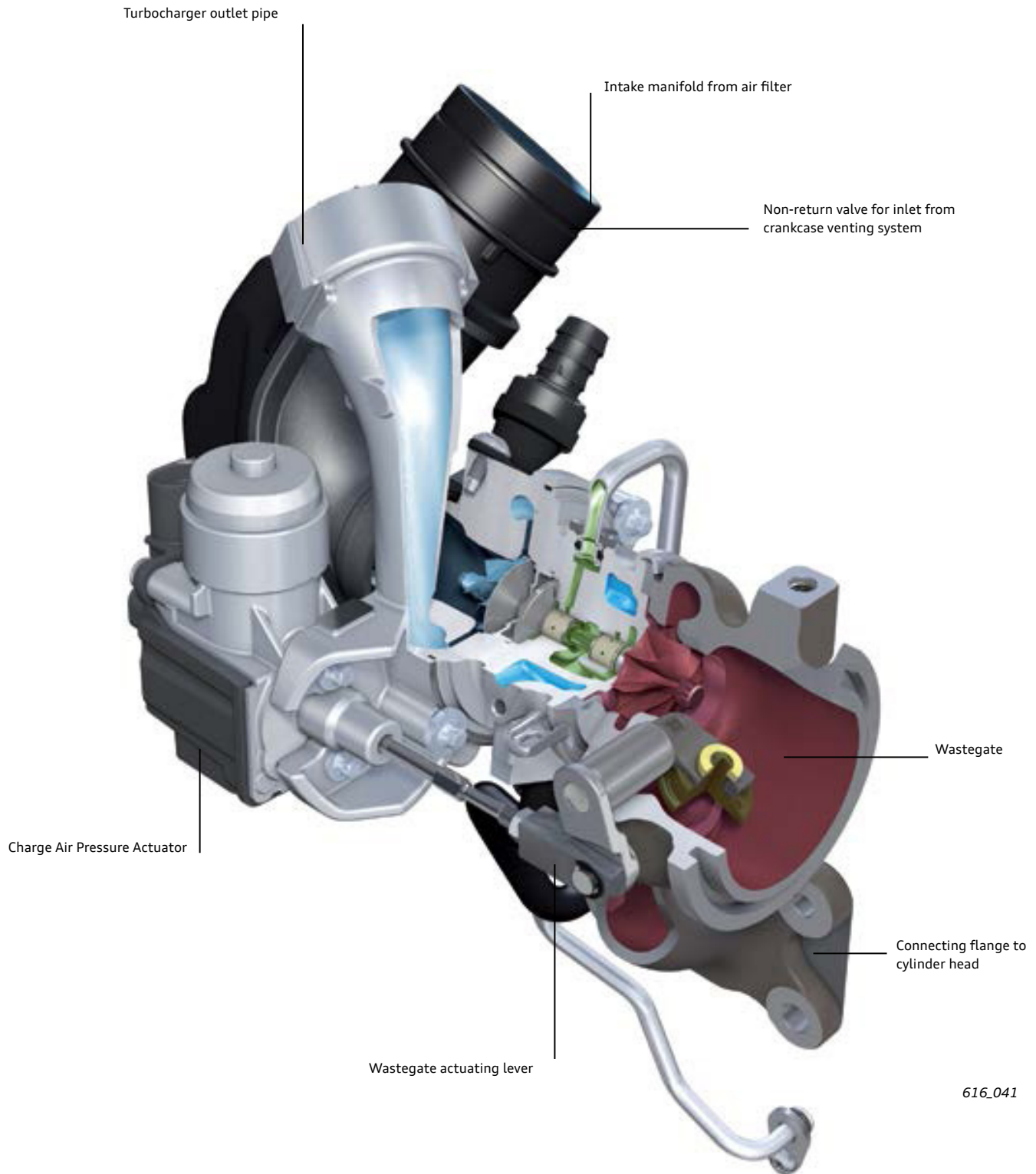
The intercooler is integrated in the injection-molded plastic intake manifold. The advantage of this is that the relatively small volume of air in the entire charge air tract can be quickly compressed. Very rapid pressure generation and very responsive engine performance are the results. The distance travelled by the charge air from the impeller to the intake manifold module through the plastic intake pipe (turbocharger outlet pipe) is also very short.



Turbocharger

Because the exhaust manifold is integrated in the cylinder head and has its own coolant jacket, it is possible to use a very lightweight mono-scroll turbocharger.

Mono-scroll turbochargers have only one inlet helix which directs the exhaust to the turbine rotor. The significant advantage is their simplicity of design, which makes monoscroll turbochargers especially light and economical.

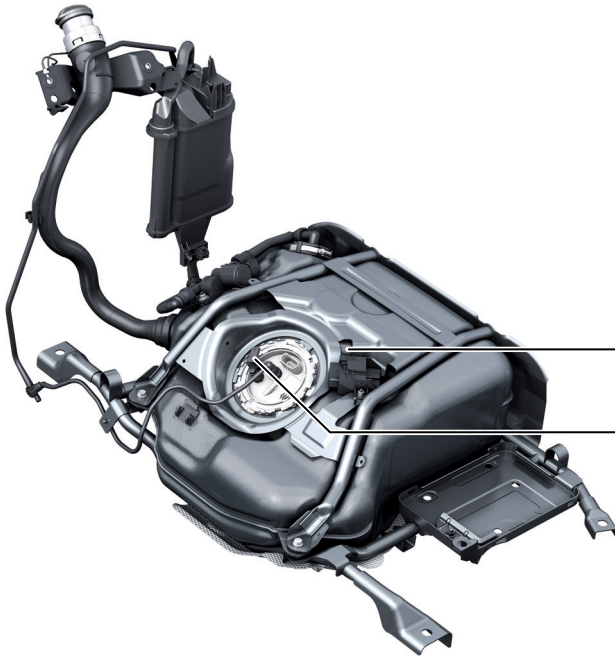


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Fuel system

Because hydrocarbons also form when the vehicle is driven in electric-only mode, there is a danger of overloading the activated charcoal filter (carbon canister). To prevent this, the A3 Sportback e-tron is equipped with a pressure reservoir.

During electric-only driving, the line leading to the carbon canister is closed by the Tank Switch-off Valve. The pressure in the fuel tank then increases to approximately 4.3 psi (0.3 bar). The pressure is measured by the Fuel Tank Pressure Sensor and relayed to the ECM.



Tank Switch-off Valve

Fuel Tank Pressure Sensor

627_094

Fuel filler flap

The fuel filler flap of the A3 Sportback e-tron is locked and cannot be opened by hand until the pressure in the fuel tank has dropped. This only takes a few seconds.

When the driver actuates the Fuel Filler Door Release Button on the driver's door panel, the ECM opens the Tank Shut-off Valve. The reduction in pressure is detected by the Fuel Tank Pressure Sensor. The Vehicle Electrical System Control Module 1 then automatically opens the fuel filler flap.

The status of the fuel filler flap is indicated in the DIS.

Fuel Filler Door Release Button



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627_096



627_097

Power transmission

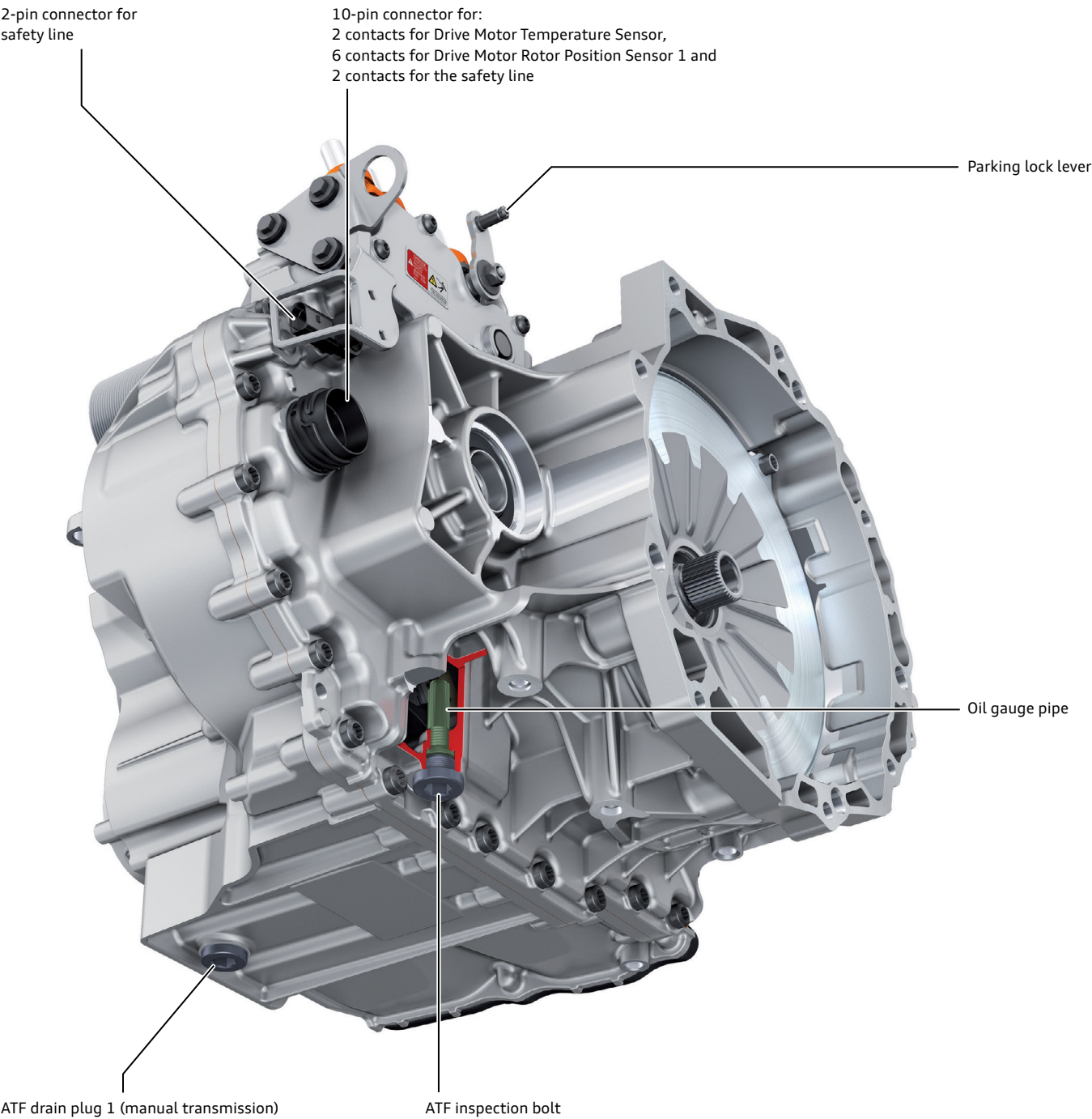
Overview

Power transmission is provided by the front wheel drive, six-speed S tronic (DSG) transmission.

The integrated Electro-drive Drive Motor (e-machine) is a permanently excited synchronous machine that develops up to 102 hp (75 kW) of power. It is capable of delivering approximately 243 lb ft (330 Nm) of torque to the transmission. The e-machine provides electric-only drive-away from standstill and electric-only driving as well as starting the internal combustion engine via clutch K0.

If necessary, in Boost mode, the e-machine and internal combustion engine are connected via clutch K0 and deliver the maximum system power to the transmission.

In generator mode, the e-engine is driven by the internal combustion engine using the vehicle's propulsion energy (recuperation) or through the closed K0 clutch. The electric drive motor supplies power to the entire vehicle.



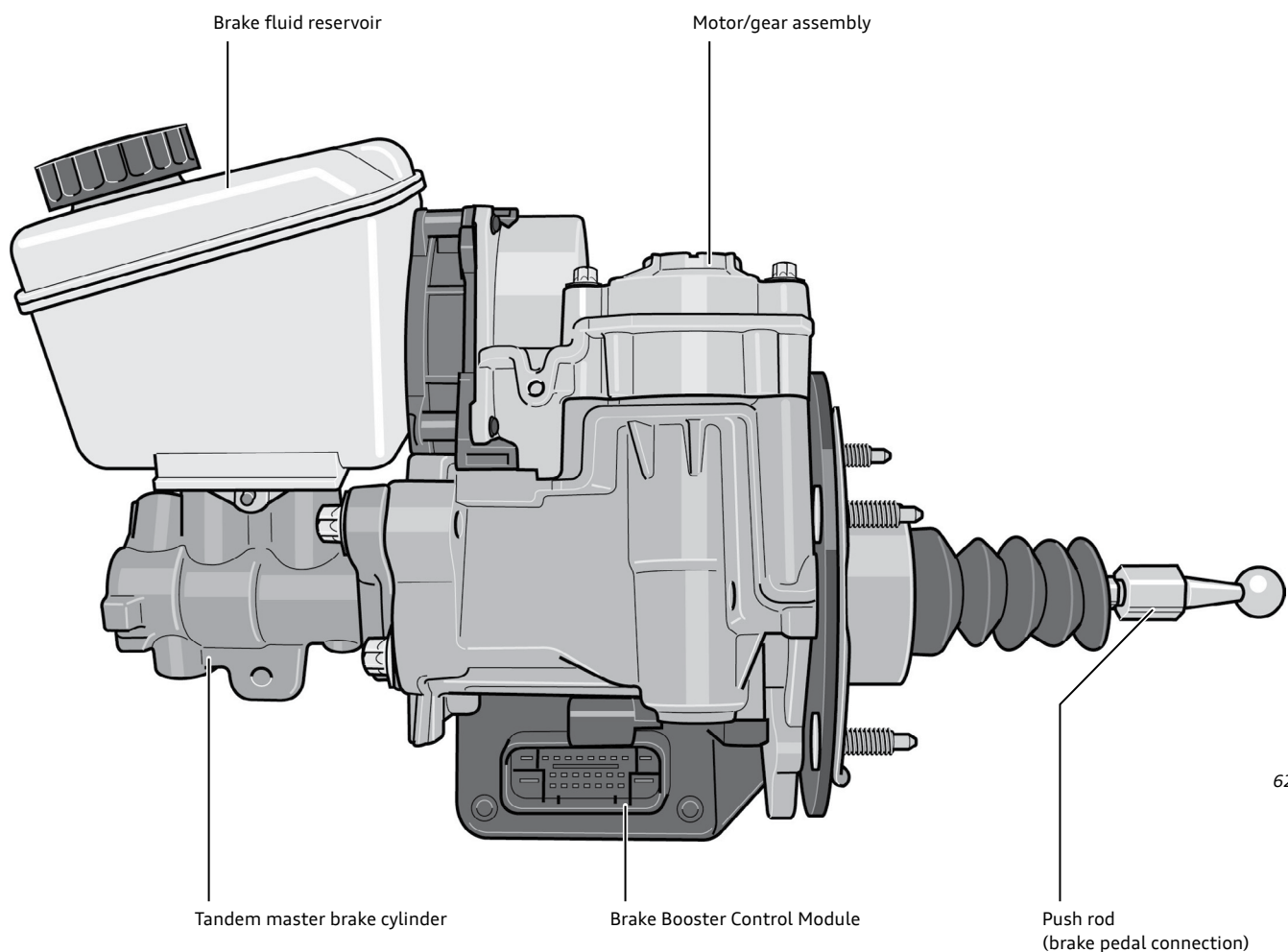
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Electro-mechanical brake servo

Because intake manifold vacuum isn't available when driving in electric only mode, a new brake booster system was developed. The use of the electro-mechanical brake servo eliminates the need for an additional vacuum pump normally used in conjunction with a conventional pneumatic brake servo.

The electro-mechanical brake servo offers the following key advantages over a conventional pneumatic brake servo:

- ▶ Vacuum-independent brake servo.
- ▶ High pressure generation dynamics.
- ▶ High pressure regulation accuracy.
- ▶ Constant brake pedal characteristic/pedal force.



627_099

Suspension

Overview

The suspension system of the Audi A3 Sportback e-tron is based on the suspension system of the conventional-engined Audi A3 Sportback.

ABS/ESC module

- ▶ Carry-over from Audi A3 Sportback

Manually adjustable steering column

- ▶ Carry-over from Audi A3 Sportback

Wheels/tires

- ▶ Various e-tron light alloy wheels available. See the Product Information Book for complete details

MacPherson front suspension

- ▶ Carry-over from Audi A3 Sportback
- ▶ Modified damper setup

Electro-mechanical steering

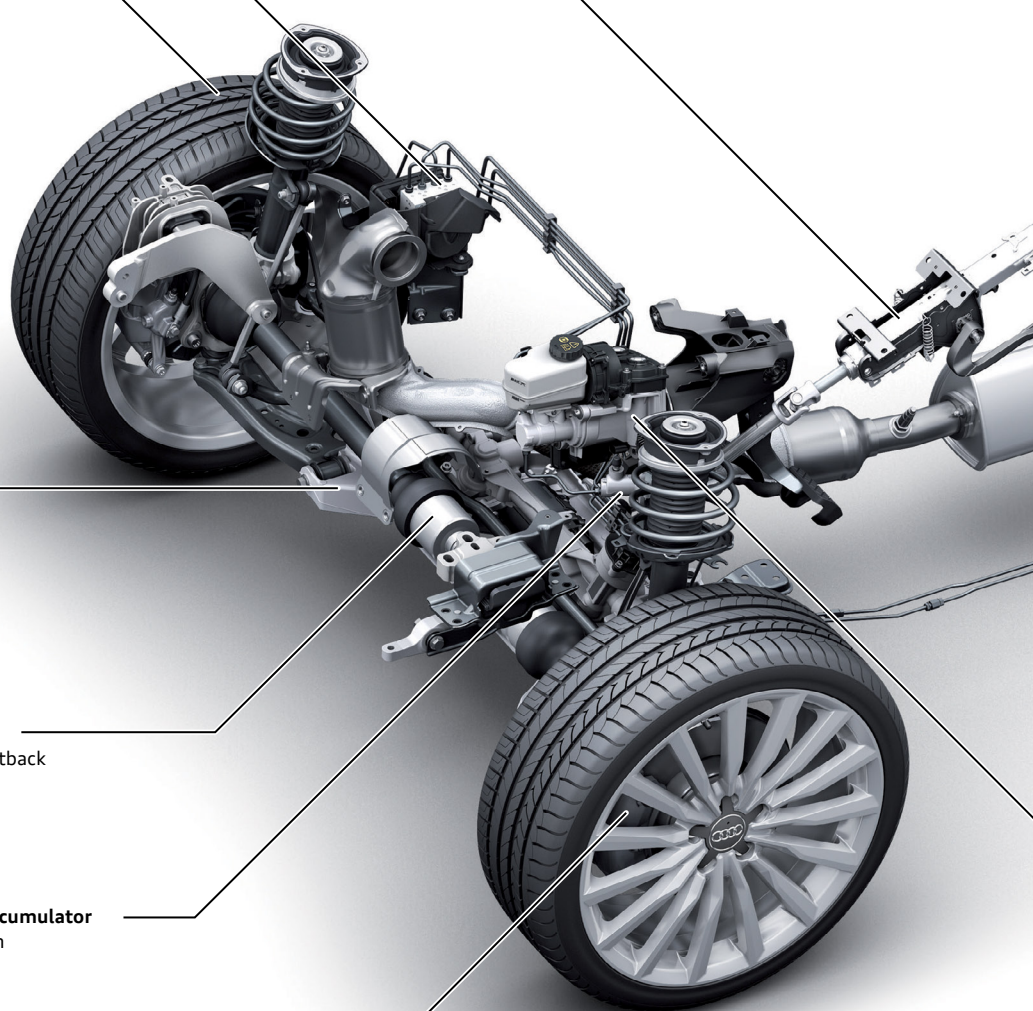
- ▶ Carry-over from Audi A3 Sportback

Brake system pressure accumulator

- ▶ New concept and design

Front wheel brakes

- ▶ 16" brake system
- ▶ Brake caliper TRW PC 57-25/14
- ▶ Brake disc diameter: 12.2 in (312 mm)

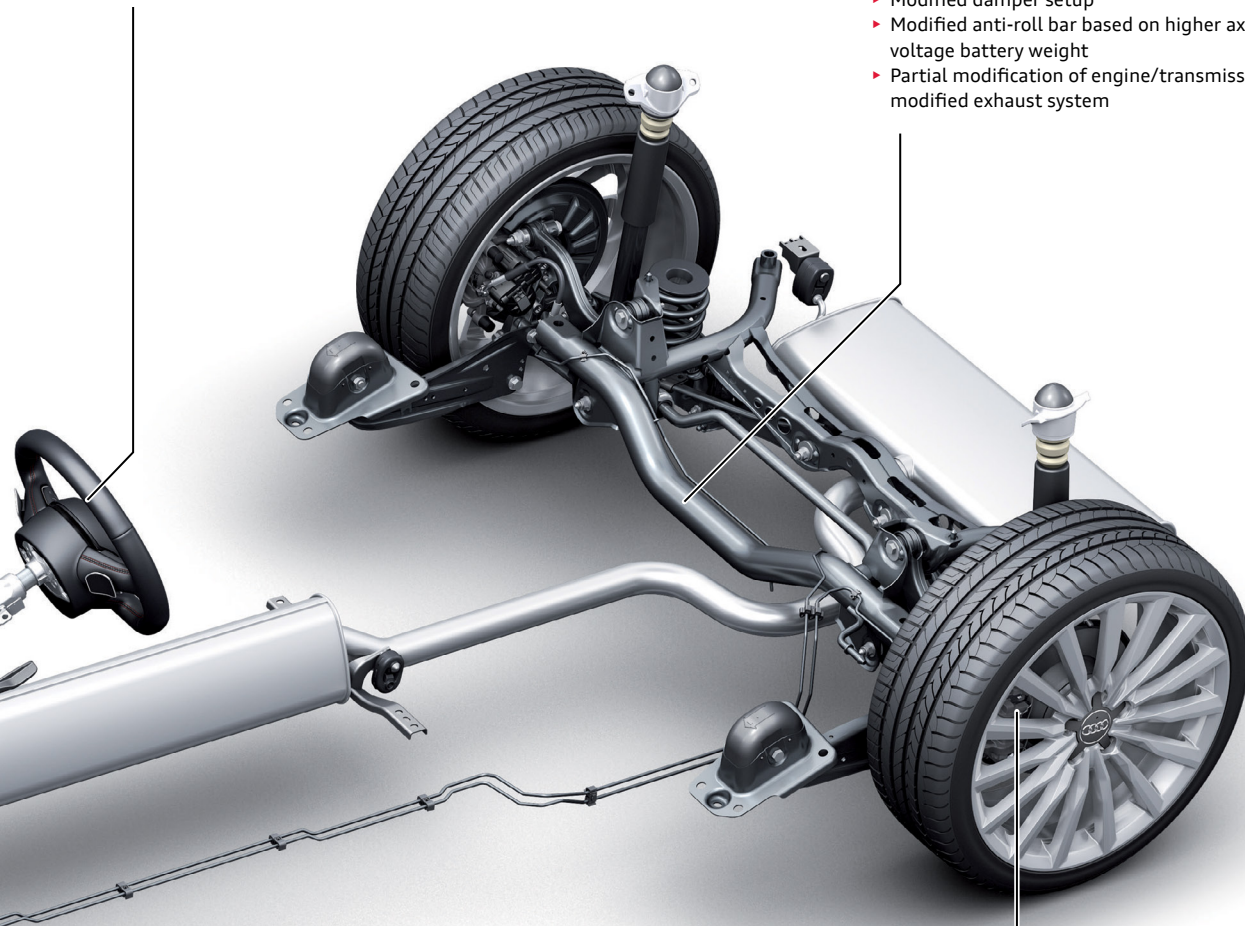


Multi-function steering wheel

- Carry-over from Audi A3 Sportback

Four-link rear suspension

- Carry-over from Audi A3 Sportback
- Modified damper setup
- Modified anti-roll bar based on higher axle load due to high voltage battery weight
- Partial modification of engine/transmission mounts due to modified exhaust system



Electro-mechanical brake servo

- First use in an Audi model

Rear wheel brakes

- 15" brake system
- Brake caliper Continental FNC-M38
- Brake disc diameter: 10.7 in (272 mm)

627_098

High voltage battery

Overview of hybrid components

The following high voltage components are installed in the Audi A3 Sportback e-tron:

Power electronics

It converts the direct current stored in the high voltage battery to alternating current for the e-machine. The power electronics are cooled by the low-temperature cooling circuit 2.

Engine

Four cylinder engine with turbocharger :

► 1.4l TFSI 147 hp (110 kW)

Charging port

The all-purpose charging cable can be used to charge the high voltage battery at both household outlets and commercial outlets using an interchangeable connecting plug (120 V AC and 240 V AC).

Electric AC compressor

The electric AC compressor is integrated into the high voltage system and cools both the passenger compartment and the Hybrid Battery Unit as required.

Electrical brake servo

The Electrical Brake Servo is used to coordinate the braking functions of electrical braking through regeneration and the hydraulic brake system. This provides a seamless brake feel based on the driver's input through the brake pedal.

PTC heater

The High Voltage Heater is used to heat the coolant for the passenger compartment heat exchanger during electric driving and is also integrated in the stationary air conditioning function.

e-machine (Electro-drive Drive Motor)

The e-machine is connected to the transmission via clutch K0. It is able to generate a braking torque at the wheel in dependence on RPM, battery temperature and state of charge.

6-speed dual clutch transmission S tronic

Consists of 2 sub-gearboxes engaged by multi-plate clutches K1 and K2. It is possible to select between 3 drive programs using the selector lever.



Information

All high voltage components are connected to the vehicle chassis via equipotential bonding.

The equipotential bonding is a low-resistance wire or bolted connection, connecting the high voltage components to the vehicle chassis.

Battery cooling system

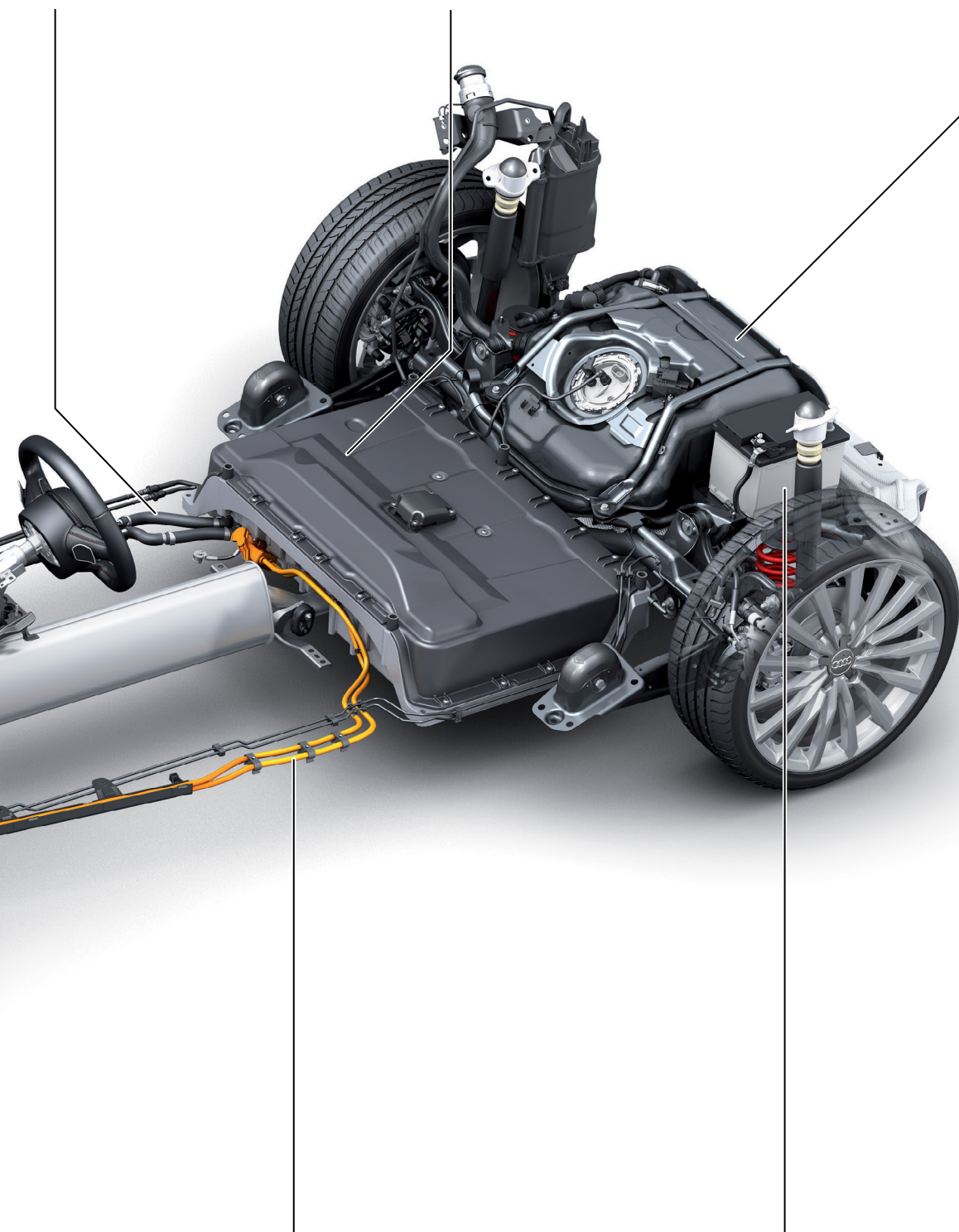
The battery cooling system is integrated into the low-temperature cooling circuit 2.

High voltage battery module

The high voltage battery module consists of 8 modules each with 12 prismatic cells. The voltage is between 280 and 390 V, depending on state of charge.

Fuel tank

The fuel tank has a capacity of 10.5 gal (40 l) and is installed over the rear axle.

**High voltage lines**

All high voltage lines are double-insulated and color-coded orange for easy recognition. To avoid incorrect assembly, the high voltage lines are mechanically coded and identified by a colored ring below the bayonet ring.

12 volt vehicle battery

Installed over the rear axle, it is responsible for supplying power to the low-voltage components.

627_003

Hybrid Battery Unit

Hybrid Battery Unit is mounted on the underside of the vehicle and has the following components:

- ▶ Battery Regulation Control Module.
- ▶ High voltage Battery Switch Box.
- ▶ 8 cell modules each with 12 battery cells and controller.
- ▶ Battery cell cooling system.
- ▶ Connections for the high voltage wiring harness.
- ▶ Connections for the 12 volt electrical system.
- ▶ Coolant connections.

The bottom section of the Hybrid Battery Unit housing is made from cast aluminum and the top section from polymer. The sections are bolted and bonded forming an airtight housing.

Pressure changes inside the housing caused by temperature variation are equalized by the pressure equalization elements. If the pressure inside the Hybrid Battery Unit is too high, the pressure relief valve opens.

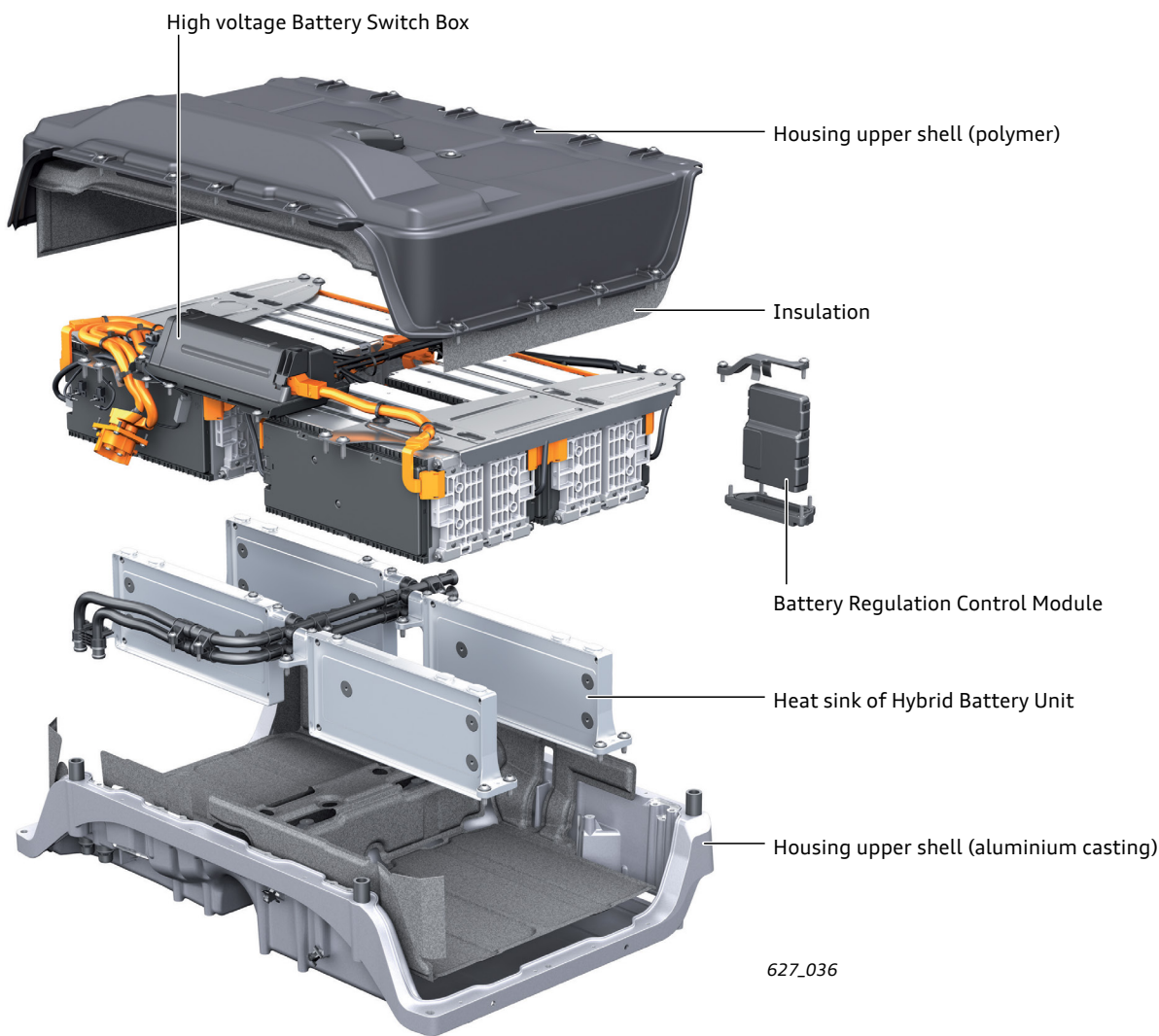
The pressure equalization elements and the pressure relief valve are installed under a cover on the top side of the Hybrid Battery Unit.

The Hybrid Battery Unit is attached to the vehicle chassis by an equipotential bond.

Rated voltage	352
Cell voltage	3.7
Number of cells	96
Capacitance in Ah	25
Operating temperature	-18 to 140 °F (-28 to 60 °C) ¹⁾
Energy content in kWh	8.8
Usable energy content in kWh	7.0 ²⁾
Power in kW	Maximum 90
Weight	264 lb (120 kg)

¹⁾ The charging/discharging currents are reduced at temperatures of 122 °F (50 °C) and higher.

²⁾ The state of charge is maintained at between 25% and 85%.



627_036

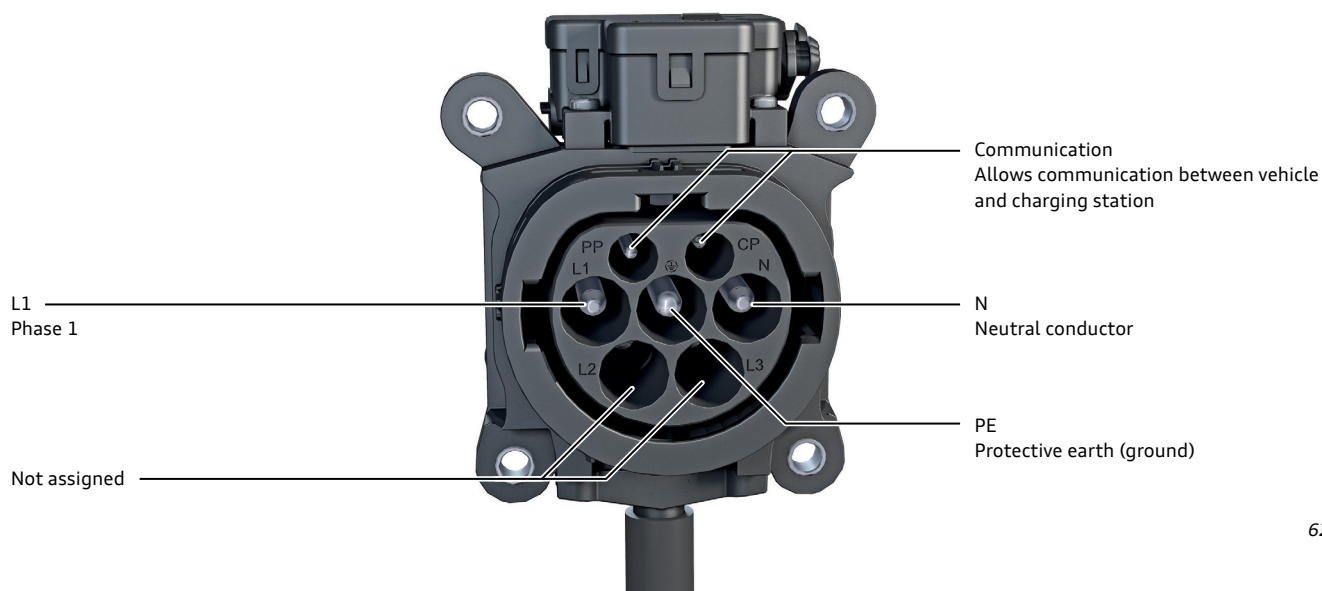
Charging

High Voltage Battery Charging Socket 1

The High Voltage Battery Charging Socket 1 is located behind a flap at the front of the radiator grille.

It is connected to the vehicle chassis via equipotential bonding.

Both the Charging Socket Temperature Sensor 1 and the High voltage Charging Connector Lock 1 Adjuster are integrated with the High-voltage Battery Charging Socket.



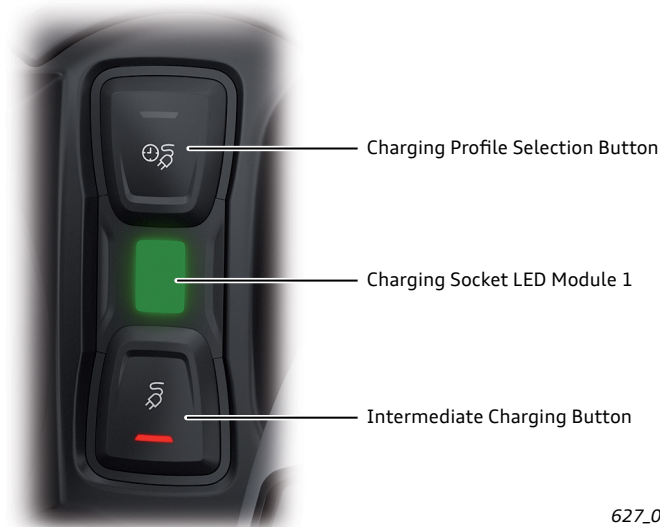
627_044

Charging button module with display

The charging button module has the following components:

- ▶ Intermediate Charging Button.
- ▶ Charging Profile Selection Button.
- ▶ Charging Socket LED Module 1.

The Charging Socket LED Module indicates the current status of the charging cycle through various colors and by flashing or steady light. The active charging option is indicated by the red LED in the button.



627_045

Overview of status LED messages

Display	Definition
LED is red	Plug has been detected, but is not locked; charging is not possible
LED is yellow	Plug has been detected and is not locked, but no charging voltage is available; charging is not possible
LED is flashing yellow	Plug has been detected and is locked, selector lever not in position P ; charging is not possible
LED flashes green every 4 s for 60 s, then the LED goes out	Timer for charging cycle is active, charging cycle starts depending on the programmed departure time
LED is flashing green	Charging cycle is active
LED lights up green and then the LED goes out	Charging cycle completed

Charging the high voltage battery

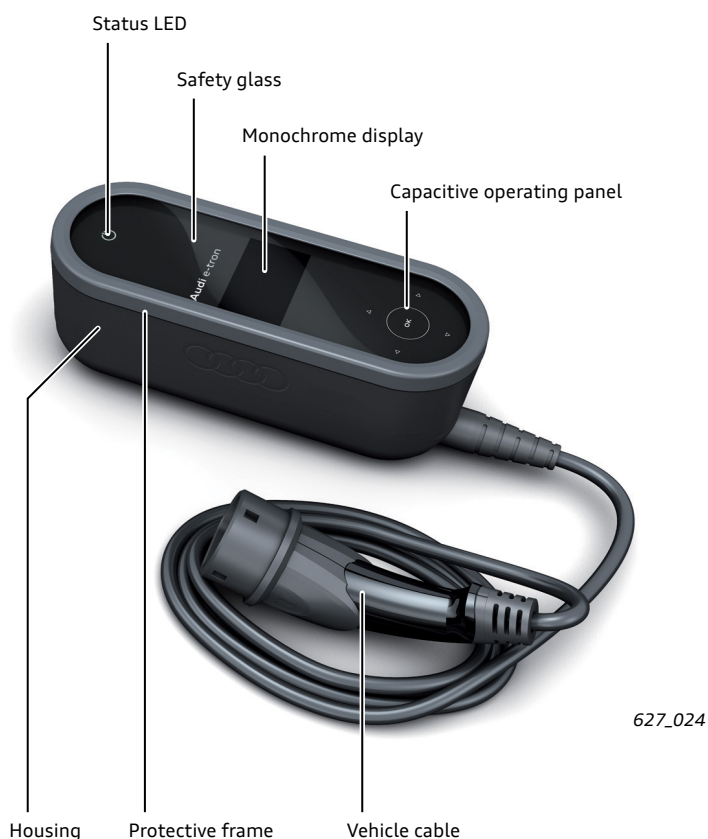
Charging with alternating current

When the vehicle is using the internal combustion engine to provide drive, the high voltage battery is charged via the e-machine, which acts as a generator.

Audi e-tron charging system

The Audi A3 Sportback e-tron comes with the Audi e-tron charging system. For mobile use, the Audi e-tron charging system can be carried in a transport case.

Two replaceable AC cables are supplied for connecting to a three-phase AC supply. One cable is suitable for household (120V) use while the other cable is for attaching to a 240V AC source.



The high voltage battery can be charged with alternating current from both a 240V AC or 120V AC voltage. Charging the vehicle with AC voltage will allow for a greater range of electric driving by charging the vehicle battery prior to driving.

Operating unit

The cables are encoded in such a way that the operating unit can detect whether a connection has been made with a 120V or 240V plug.

If the vehicle is connected with 240V AC source, the maximum power consumption is 16 A, resulting in a maximum charging output of 3.6 kW. If the vehicle is connected to a 120V outlet, power consumption is limited to 10 A.

The charging output can be set to 50% or 100% by the user. If the vehicle is connected to 240V AC, a charging output of 50% is set automatically. This setting is maintained until the charger unit is disconnected from the vehicle or the wall socket.

To prevent unauthorized access, the operating unit can be protected by entering a 4-digit PIN code. If a customer were to forget their PIN number, it can be re-set by dealership personnel.

Before the charging cycle begins, the operating unit and the high voltage charger unit in the vehicle communicate with one another.

The operating unit has a self-diagnosis function and indicates any faults detected via the display.

The operating unit has a temperature monitor. If the permissible temperature is exceeded, the charging cycle is interrupted until the temperature returns to an acceptable level.

Charging cable

A charging cable is connected from an AC power source to the Audi e-tron charger unit.



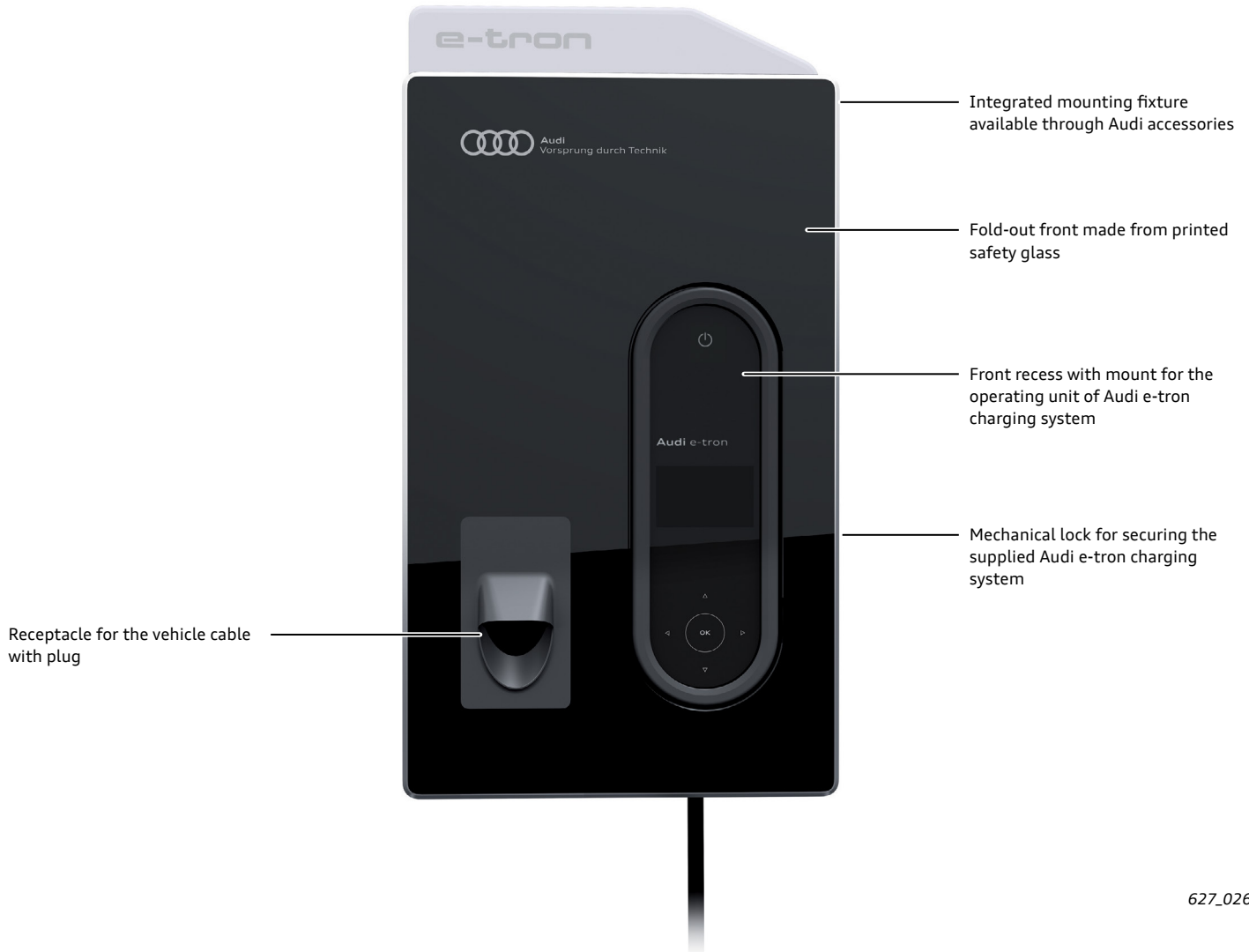
Information

The charging cable must always be connected directly to a socket. Never use the charging cable together with an extension cord, a cable drum, a multiple socket outlet or a timer. Failure to heed this warning can result in damage to the operating unit or the home electrical system.

Charging at home

A charging dock for home installation is available. It can be attached to a wall over a conventional household power outlet.

The vehicle battery charger can be clipped into the charging dock. Charging cables are available in various lengths for connecting the vehicle to the charging dock.



627_026a

Notes

Charging cycle

To charge the high voltage battery, the charging cable must be plugged into the charging dock.

When the charging cable is plugged into the vehicle, the charging plug is locked and cannot be removed. This is indicated by the yellow status LED.

The charging cycle starts when the selector lever is in position **P** and the operating unit is connected to the AC voltage source.

If no timer is programmed, the charging cycle starts immediately.

If a charging timer is programmed, but the state of charge of the high voltage battery is less than 60%, the charging cycle starts immediately until the state of charge reaches approximately 60%. If the instant charge button is pressed, the charging cycle stops and timer programming is activated.

The active charging cycle is indicated by the flashing LED on the relevant button (see page 27).



Displays of the status LED

The status LED flashes green during the charging cycle.

The charging cycle will stop if the vehicle is unlocked while charging is in progress.

If the charging plug is not removed within 30 seconds of unlocking the vehicle, the charging cycle will restart.

Charging times

The charging times are dependent on the AC voltage source:

Household 120V	8 h
Commercial 240V	2 h 15 min

627_028



627_029



Information

The vehicle cannot be started if the charging cable is plugged in. During the charging period, the 12 volt battery is also charged.

Hybrid manager

The software of Engine Control Module has been extended to include the hybrid manager function.

- ▶ Operating strategy.
- ▶ Torque distribution to the Electro-drive Drive Motor and the internal combustion engine.
- ▶ High voltage coordinator.
- ▶ Recuperation under braking and acceleration.
- ▶ Control of the coolant circuits.

Operating strategy

The operating strategy is configured to operate the vehicle efficiently using both drive systems. Taking the ambient conditions and information from other control modules as well as the driving profile into account, the system decides whether to use the internal combustion engine, the e-machine or both.

	Internal combustion engine is:	Electro-drive Drive Motor serves as:
Internal combustion engine start	off	Electric motor ¹⁾
Electric drive	off	Electric motor ¹⁾
Drive by internal combustion engine	on	Generator
Hybrid drive	on	Electric motor ¹⁾
Boost	on	Electric motor ¹⁾
Recuperation with and without electrical braking	on or off	Generator

¹⁾ In this operating mode, the 12-volt electrical system is supplied by Hybrid Battery Unit.

High voltage coordinator

In its capacity as a high voltage coordinator, the hybrid manager monitors and coordinates all high voltage components. It enables activation of the high voltage system and controls the displays for hybrid operation and display of messages for the driver.

The following hybrid-specific functions of the vehicle are controlled by the hybrid manager.

- ▶ Control of hybrid displays.
- ▶ Power meter.
- ▶ Display in dash panel insert.
- ▶ MMI energy flow diagrams.
- ▶ e-tron statistics.

Electric driving also requires enabling signals from other control modules. A low state of charge in the high voltage battery, a too-low ambient temperature, high torque demand or high cabin heating demand may necessitate starting the internal combustion engine.

Recuperation under braking and acceleration

The hybrid manager controls over-run and braking recuperation functions based on the position of the accelerator or brake pedal, the state of charge of the high voltage battery, the vehicle's speed and driving stability criteria.

Plug-in hybrid modes

Electric driving (EV)

When the ignition is on, EV mode is active and the vehicle preferentially runs on electric-only mode provided the conditions for this are met.

EV mode is only active if the state of charge of the high voltage battery is sufficient and the following conditions are met:

- ▶ The temperature of the 12-volt battery and of the high voltage battery is not less than approximately 14 °F (-10 °C).
- ▶ The vehicle is not travelling faster than approximately 80 mph (130 km/h).
- ▶ No kick-down is performed.
- ▶ The selector lever is not engaged in the **S** position.

If one or more of the above conditions is not met, EV mode is deactivated.

Use battery charge (Hybrid Auto)

A decision is made based on the driving profile whether to start in Hybrid mode or to run on electric power.

When the route guidance function is active in the navigation system, the use of electrical power is optimized through moderate recharging or startup of charging stations based on the predictive route data.

Hold battery charge (Hybrid Hold)

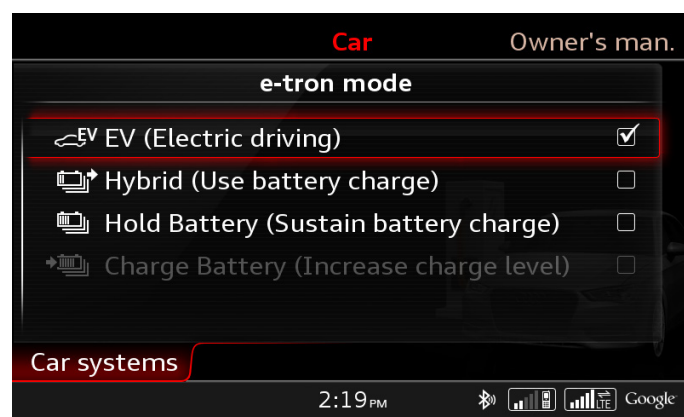
During vehicle operation, the state of charge of the high voltage battery is held at a constant level. The vehicle runs in Hybrid mode and uses only a small portion of the battery charge.

Increase battery charge (Hybrid Charge)

During vehicle operation, the high voltage battery is charged by the internal combustion engine more intensively (this involves higher fuel consumption) in order to achieve longer electrical range, for example, at the destination.

Sport mode

Moving the selector lever into tiptronic or **S** reveals the sporty side of the Audi A3 Sportback e-tron. Full drive power is now available to the driver at any time, and the high voltage battery is continuously recharged. Increased over-run torque boosts recuperation capacity and provides a sporty driving feel.



627_066a



Information

These settings can be made in the "Car" menu under "Systems" in the menu item "e-tron mode" or by pressing the Electric Drive Button several times.

Climate control

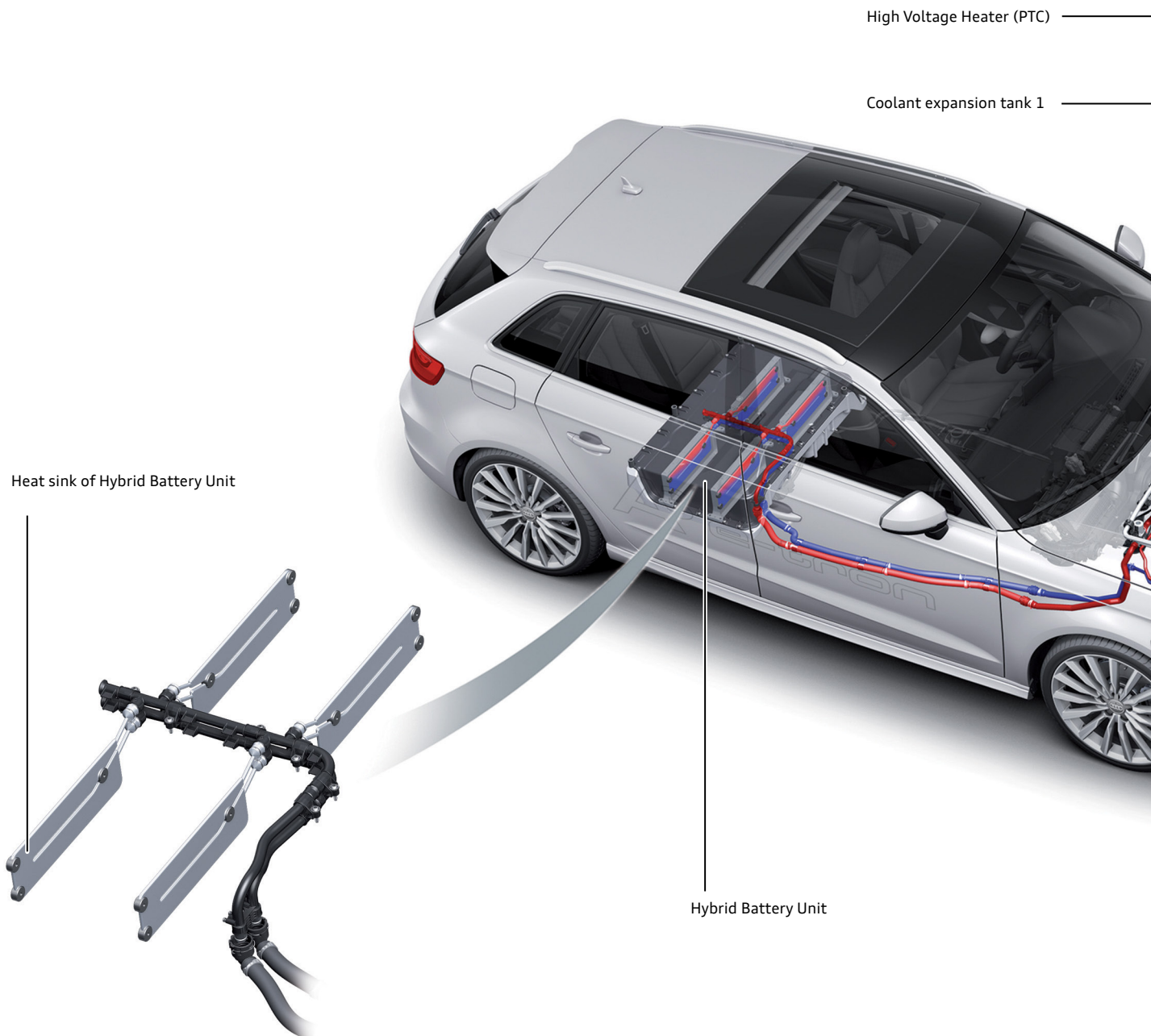
Cooling systems, climate control and thermal management

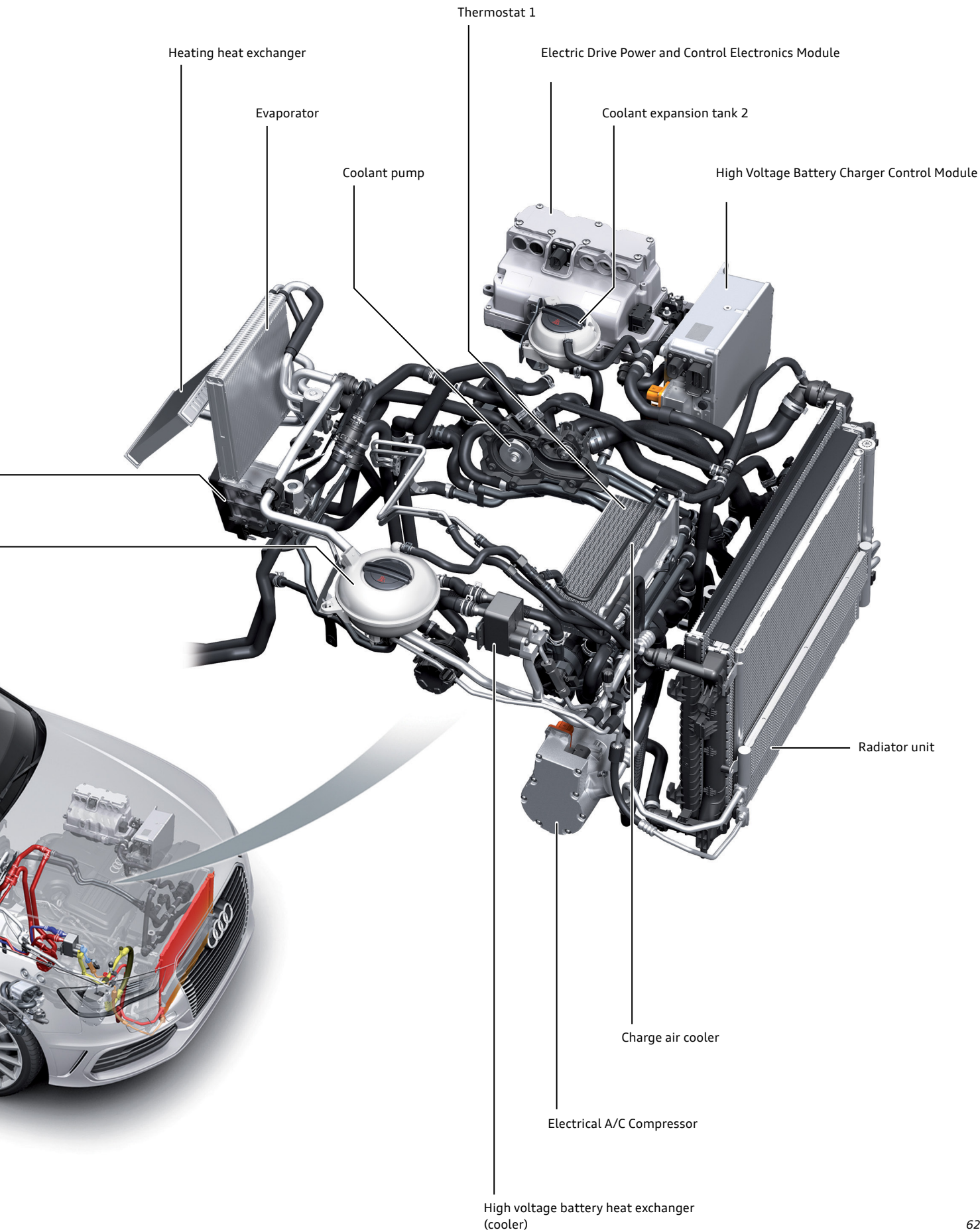
The cooling and climate control systems of the A3 Sportback e-tron provide passenger comfort, cooling of the internal combustion engine, transmission and high voltage components. All components are integrated into the various cooling circuits.

In the various operating states, for example in electric drive mode or in Boost mode, the cooling circuits provide the optimal coolant flow in order to ensure operational reliability, a high level of passenger comfort and a high overall level of efficiency.

The thermal management system enables the components to reach their operating temperatures quickly. Passenger comfort has the highest priority.

Overview of cooling system

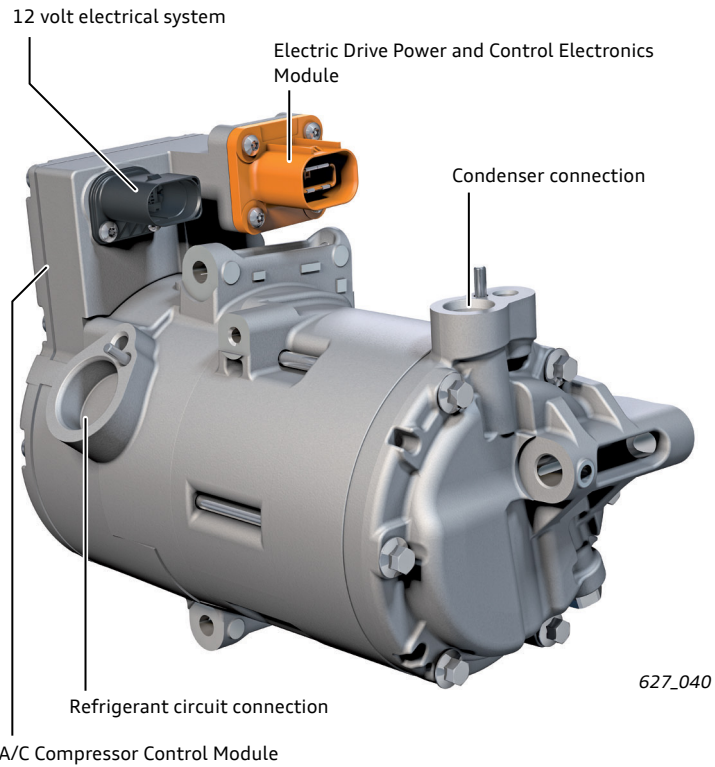




Electrical A/C compressor

The Electrical A/C Compressor is bolted to the front of the internal combustion engine. There is no belt drive. It is integrated with the high voltage electrical system via the High Voltage Battery Charger 1 and operates at 352 volts. The A/C Compressor Control Module J842 is integrated with the compressor. The A/C Compressor Control Module is controlled by the Climatronic Control Module. The A/C compressor is attached by an equipotential bonding.

Type	Scroll compressor
Rated voltage in V	352
Speed in RPM	800 – 8600
Power consumption in kW	3.6
Weight in kg	13.2 lb (6 kg)

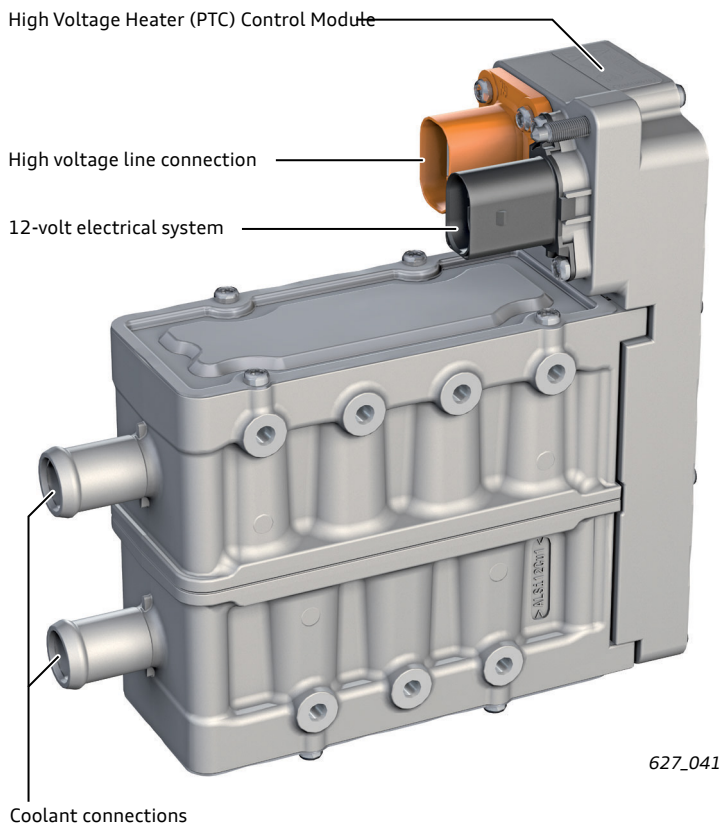


High Voltage Heater (PTC)

When the vehicle is driven in electric-only mode, the High-voltage Heater heats the engine coolant for the passenger compartment heat exchanger. It is bolted to the vehicle underbody and connected to the High Voltage Battery Charger by a high voltage line. The integrated High Voltage Heater (PTC) Control Module is controlled by the Climatronic Control Module.

The High-voltage Heater (PTC) Control Module monitors the inlet and outlet temperatures of the engine coolant via temperature sensors and send the information to the Climatronic Control Module. The Climatronic Control Module then determines the required heating output and sends this information to the High-voltage Heater (PTC) Control Module as a value between 0 and 100%.

Rated voltage	352
Heating levels	3
Activation mechanism	PWM signal 0 - 100%



Stationary HVAC

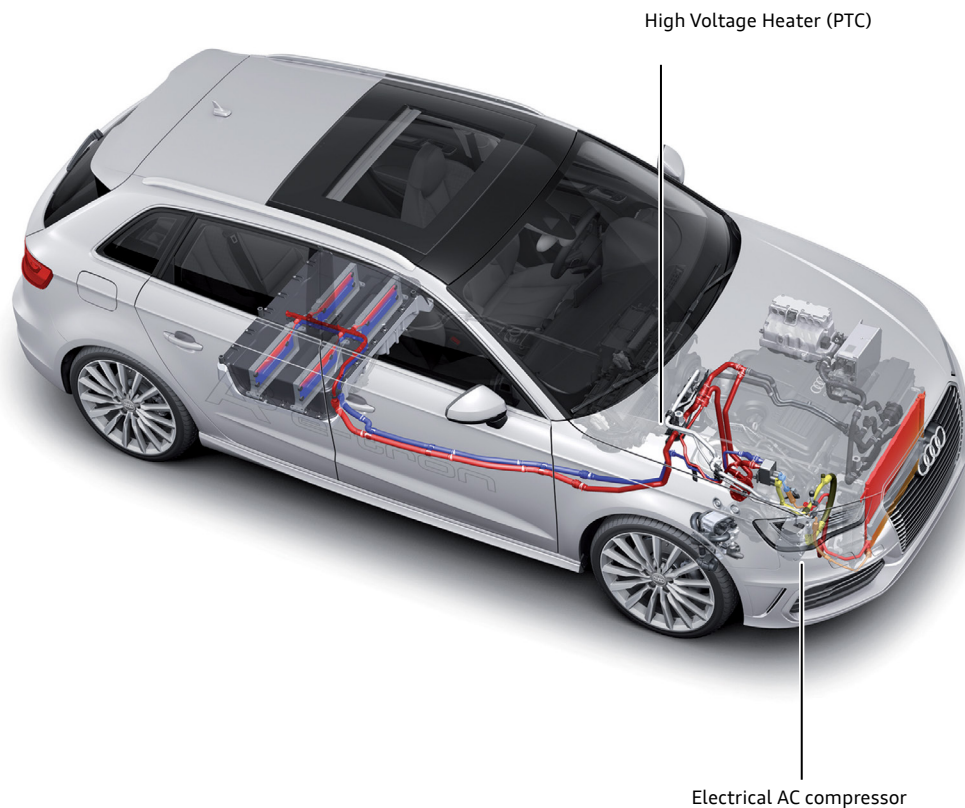
On the Audi A3 Sportback e-tron, the stationary HVAC can be selected via the MMI or using a smartphone app.

The following vehicle components can be used for stationary HVAC:

- ▶ Electrical AC compressor.
- ▶ High Voltage heater (PTC).

Conditions for operation of the stationary HVAC system

- ▶ The stationary HVAC system can be programmed and started by the MMI or using the smartphone app.
- ▶ The stationary HVAC system has the capacity to cool the vehicle using the Electrical A/C Compressor at high temperatures.
- ▶ Stationary HVAC is only possible if the Hybrid Battery Unit is sufficiently charged and if there is enough fuel in the fuel tank.
- ▶ The stationary HVAC also has the ability to warm the vehicle using the high voltage heater (PTC).



Infotainment

The 2016 A3 Sportback e-tron is equipped with the Modular Infotainment Platform (MIB).

Overview of versions

The Audi A3 Sportback e-tron is available with two versions of the information/entertainment system. It comes with the MMI radio as standard. The technical designation for this is MIB Standard. MMI Navigation plus is optional. The technical designation for this is MIB High.

The table on the following page shows the key standard and optional equipment features.



627_092

MMI Navigation plus with Audi connect

MMI Radio



MMI Navigation plus with Audi connect



Standard equipment

5.8" TFT colour monitor with a resolution of 400 x 240 pixels	7.0" TFT colour monitor with 800 x 480 pixel resolution
	3D hard drive navigation system
	MMI touch
AM/FM radio with phase diversity	AM/FM radio with phase diversity and background tuner
Car menu	Car menu
CD drive (MP3, WMA, AAC)	DVD drive (audio/video, MP3, AAC, WMA, MPEG4)
1 SD card reader (SDHX up to 32 GB)	2 SD card reader (SDHX up to 32 GB)
	approx. 11 GB for jukebox
	Audi music interface
Audi Sound System	Audi sound system
Bluetooth interface with speech dialogue system and audio streaming	Bluetooth interface with speech dialogue system and audio streaming
Premium interactive voice control system	Premium interactive voice control system
Audi connect e-tron services	Audi connect e-tron services
Sirius	Sirius

Optional equipment

Audi music interface	Bang & Olufsen Sound System Standard on Prestige, optional on Premium Plus
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Audi connect

The term Audi connect embraces applications and developments which allow media to be used in the vehicle and to be connected to the outside world.

Audi connect e-tron services

Audi has developed special connect services for the e-tron. They allow specific information to be retrieved by smartphone and web portal as well as individual functions to be controlled by a smartphone. These services are available as standard in the Audi A3 Sportback e-tron and have to be activated by the customer.

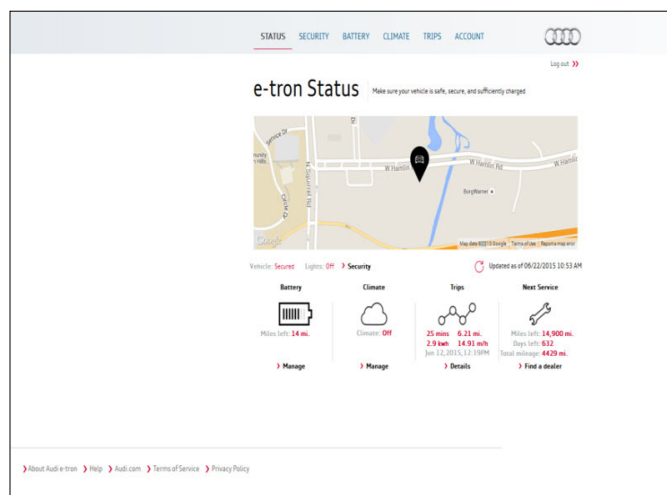
This information can be retrieved via a smartphone app and the A3 e-tron website @ www.etrn.audiusa.com. Data on vehicle status can be retrieved. This includes current state of charge, remaining electrical range and vehicle location. Information on recent trips, such as average electrical consumption, is also available.

The charging cycle and the air conditioning system can be started immediately by the app or after a specified time has elapsed (using a customizable departure timer), allowing the user to ensure that the vehicle is charged up and optimally pre-conditioned before driving. The combination of charging cycle and preconditioning enable the vehicle to retain its full electrical range. If the vehicle is ready for charging, the power required to cool or heat the passenger compartment is drawn from the wall plug without discharging the vehicle's high voltage battery.

Control Module for Emergency Call Module and Communication Unit J949 acts as the interface between the vehicle and the smartphone or e-tron platform.



627_087



627_086a

Audi connect

Other Audi connect services can be used if the vehicle is equipped with Audi MMI Navigation plus and Audi connect.



Audi connect

627_088

Display elements for driving in hybrid mode

The Audi A3 Sportback e-tron uses the following components to indicate that it is running in hybrid mode:

- ▶ Power meter instead of a tachometer.
- ▶ Special display in the instrument cluster.
- ▶ Animated display on MMI screen.
- ▶ High voltage battery charge indicator instead of coolant temperature display.

Displays in power meter

The power meter displays various vehicle operating states and the power output or charging capacity of the hybrid system during the trip.



627_048

European instrument cluster shown in illustration

Key:

- | | |
|--|---|
| <p>1 Vehicle ready "Hybrid Ready", "Terminal 15 on" and "Enable terminal 50 on" depending on the enabling conditions</p> <p>2 Electric driving (engine starting is possible) or hybrid driving</p> <p>3 Threshold for EV mode</p> <p>4 Economical driving (partial throttle range)</p> <p>5 Full throttle range</p> <p>6 Internal combustion engine 100%</p> | <p>7 Electric drive motor provides assistance in addition to maximum engine torque (boost)</p> <p>8 Fuel gauge</p> <p>9 Charge level of high voltage battery</p> <p>10 Terminal 15 off or terminal 15 on and terminal 50 off</p> <p>11 Hydraulic braking in addition to electrical braking</p> <p>12 Energy recovery by recuperation (under braking and acceleration)</p> |
|--|---|

Displays in the instrument cluster

The driver can see the energy flow within the high voltage system.

Status of the hybrid system

EV mode is activated.

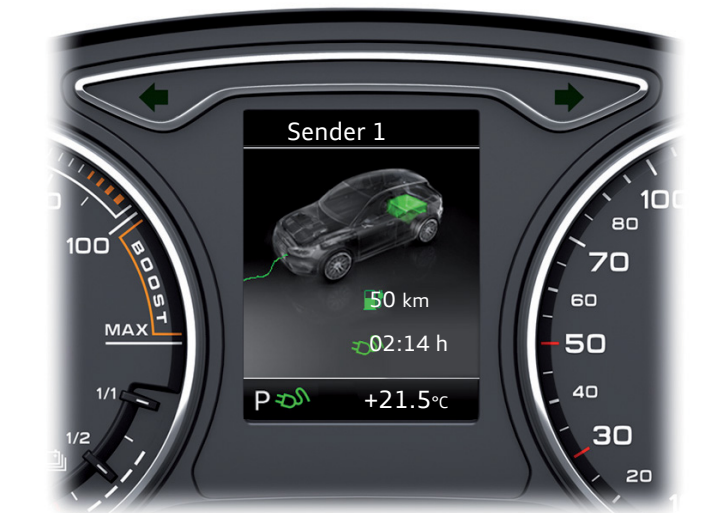


(European instrument cluster shown in illustration) 627_061

The messages displayed in the dash panel insert and/or MMI display can be used for this purpose.

Charging cycle display

Information on range of high voltage battery charge and charging duration.



(European instrument cluster shown in illustration) 627_062

Information on the hybrid system

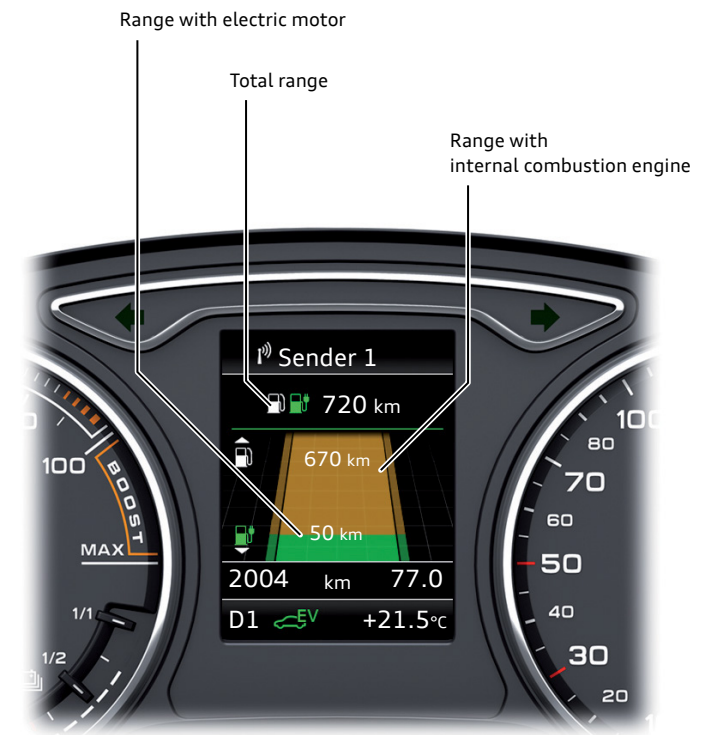
A system malfunction has occurred and the driver is prompted to take the vehicle in for servicing.



(European instrument cluster shown in illustration) 627_063

Range display

The range of the electric motor and the internal combustion engine are displayed.

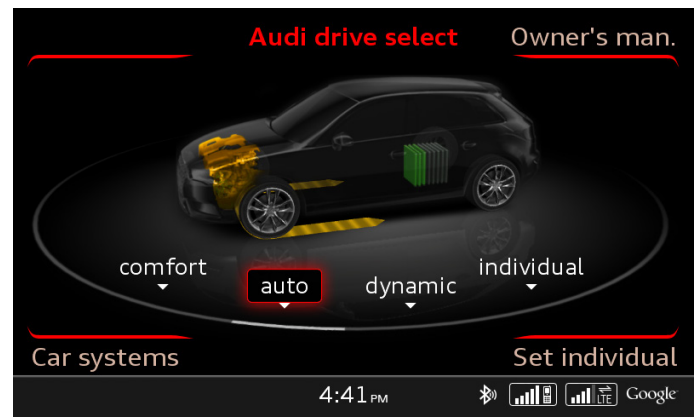


(European instrument cluster shown in illustration) 627_049

Displays on the MMI screen

Energy flow display

The energy flow is indicated to the driver on the screen.



627_050a

e-tron statistics

The driver can call up the e-tron statistics on the display.

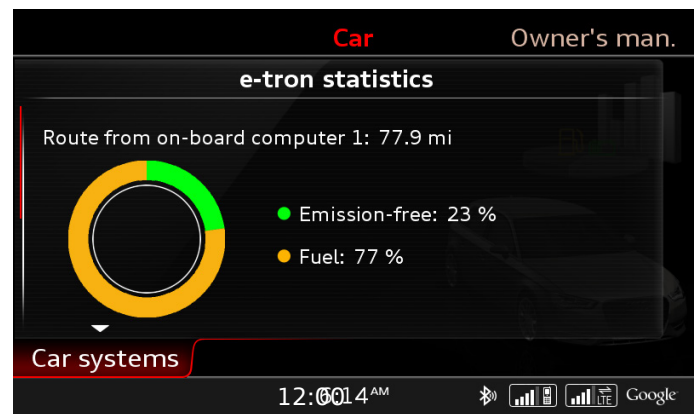
"Emission-free:"

- ▶ distance covered with zero emissions (electric + coasting + recuperation)

"Fuel grade:"

- ▶ distance covered with the internal combustion engine

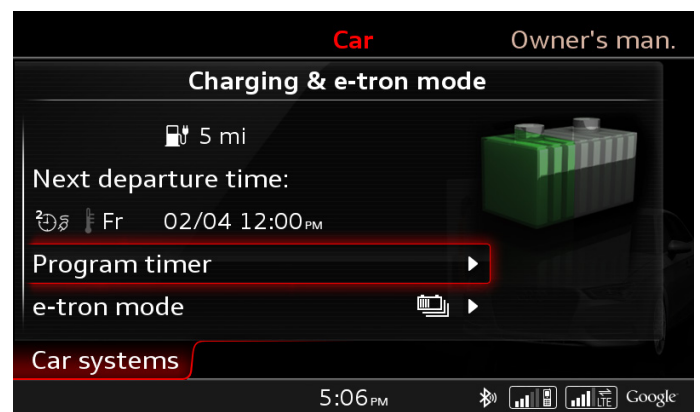
Statistics can be displayed for actual trip and total distance covered. The current display is dependent on the onboard computer.



627_064a

Charging and e-tron mode

The driver can view the settings.

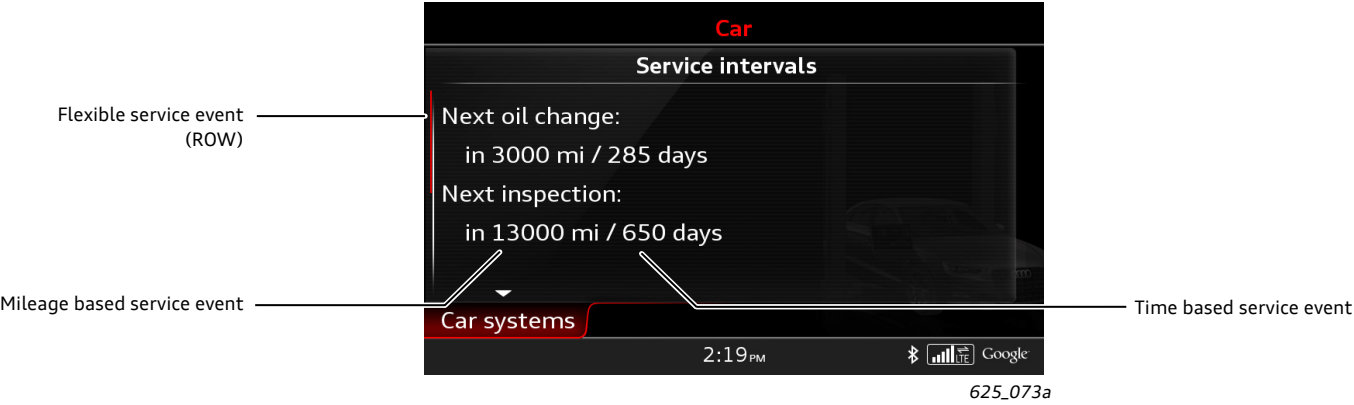


627_065b

Service

Service interval overview for North American region

Service recommendations can be viewed through the MMI.

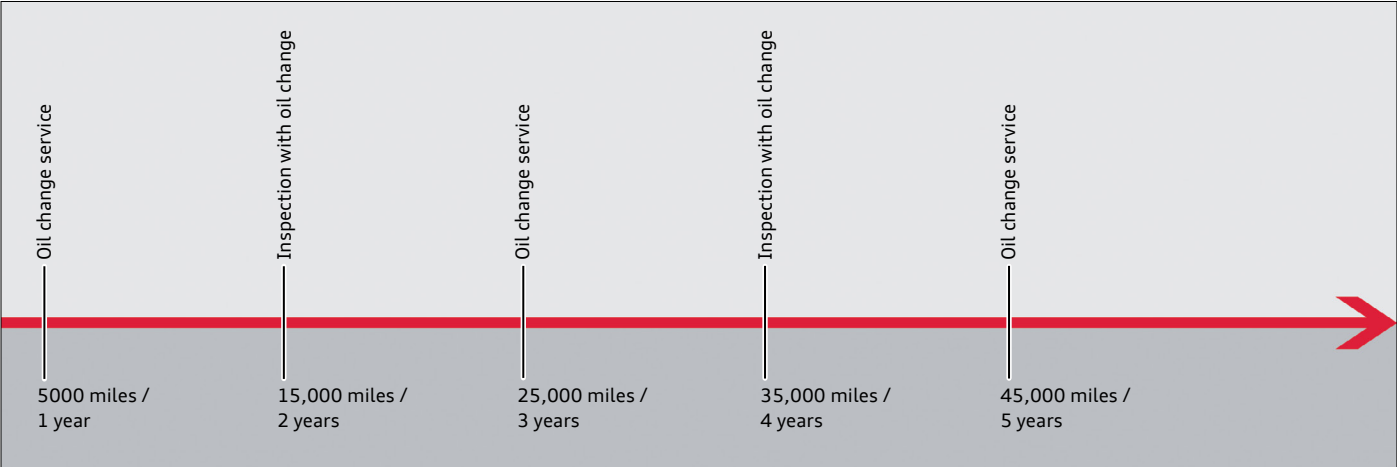


Overview of maintenance intervals for vehicles in the USA

The Audi A3 Sportback e-tron is generally subject to fixed inspection and maintenance intervals in the US market.

The value indicated for the next oil change is 5,000 miles / 365 days for new vehicles. The next oil change after this is set at 10,000 miles / 365 days.

The value for the next inspection is 15,000 miles / 730 days for new vehicles. The next inspection after this is done together with the oil change at 20,000 miles / 730 days.



Frequently Asked Questions (FAQs)

Extreme care should be taken when working on hybrid vehicles. You must always follow relevant regulations and guidelines. This information will help you recognize hazards, enabling you to respond promptly and correctly in the event of an accident.

Q: Can the 2016 Audi A3 Sportback e-tron be washed in an automatic car wash?

A: Yes, the 2016 Audi A3 Sportback e-tron can be washed in an automatic car wash without any special restrictions.

Q: Can you perform an engine wash on the 2016 Audi A3 Sportback e-tron?

A: You can perform an engine wash on the 2016 Audi A3 Sportback e-tron as long as you observe accepted environmental rules. If using a high pressure sprayer, do not aim it directly at high voltage components.

Q: What should I do if the vehicle needs to be towed?

A: The vehicle should be transported by flat bed towing. If this is not possible, it must be flat towed (front or rear axles must not be raised) and a towing speed of 31 mph (50 km/h) must not be exceeded.

Q: Can the 2016 Audi A3 Sportback e-tron be driven without a high voltage battery?

A: Any malfunction in the high voltage battery will trigger defined error mechanisms in the system. In the event of a more serious defect, the high voltage system will usually shut down. If this happens, the vehicle can only be driven until the 12V battery is discharged.

Q: What do I need to know about raising the vehicle on a car lift, wheel alignment platform, or brake test platform?

A: There are no special instructions for the 2016 Audi A3 Sportback e-tron that differ from the standard Audi Q5. Important: if the ignition is switched ON, the combustion engine may start.

Q: Does the customer require special training for the 2016 Audi A3 Sportback e-tron?

A: The customer does not need any special training. However, the information in the owner's manual specific to hybrid technology should be noted.

Q: What service work can be done by the customer?

A: All non-high voltage system service work can be done by the customer, as with any other Audi vehicle. However, work on the high voltage system should only be done by a trained high voltage technician at an authorized service center in accordance with Audi guidelines.

Q: What additional tasks should be performed as part of PDI?

A: No additional preparations are needed for high voltage components during the PDI of the 2016 Audi A3 Sportback e-tron. In transport mode, the electric motor is used solely as a generator, which means that electric driving, boost, start-stop, and recuperation are not possible. In this mode, the high voltage battery is continually charged as long as the combustion engine is running.

Q: What needs to be kept in mind when the 2016 Audi A3 Sportback e-tron is parked or stored?

A: Please refer to the standard checklist for vehicles in stock and in storage. This list describes what activities need to be carried out and when.

Q: What should be done in the event of an accident?

A: First, either someone in the car or a rescue worker should switch OFF the ignition. This process is the same as in any Audi vehicle. The high voltage system in the 2016 Audi A3 Sportback e-tron is automatically shut down when the belt tensioners or airbags are activated. There is no need for emergency responders to isolate it. Details are provided in a separate manual for emergency services.

Q: What type of voltage and current are there in the high voltage system of the 2016 Audi A3 Sportback e-tron?

A: When the high voltage system is active, direct current (DC) voltage flows through the electric A/C compressor, high voltage battery, and power electronics. The electric motor operates with alternating current (AC) voltage. An extra capacitor is fitted in the power electronics to serve as a power reserve. This capacitor is discharged when the ignition is switched OFF.

Q: What levels of voltage and currents are dangerous?

A: Alternating voltage of 25V or above and direct voltage of 60V or above are dangerous. Maximum contact voltage must not exceed 50V for alternating current (AC) voltage or 120V for direct current (DC) voltage. A current of approximately 5mA or more can be recognized by the human body, with a current of approximately 10mA or more representing a serious safety hazard.

Q: What are the effects of alternating current (AC) and direct current (DC) if a person comes in direct bodily contact with these currents?

A: Alternating current (AC): Direct contact with this current will add a harmful disruptive electrical current to the human body that can trigger involuntary vibrations in the muscles and heart. The lower the frequency, the more dangerous the voltage. Ventricular fibrillation (heartbeat alteration and/or heart stoppage) can result. Without prompt first aid, this can prove fatal. Direct current (DC): Direct contact with this current can break down (liquefy) body tissues through electrolytic dissolution, resulting in tissue poisoning. This damage will only be noticeable several days after the DC direct contact, and if left untreated, can be fatal.

Q: What are the effects and after effects of electrical accidents?

A: Shock effect: Risk of injury from uncontrolled movements and loss of balance.

Thermal effect: Burns and carbonizations at the entry and exit points of the current, as well as internal burns. Resulting stress to the kidneys may be fatal.

Chemical effect: Blood and cell fluids are broken down by electrolysis. The result is serious poisoning that becomes noticeable after several days

Effect on muscles: Muscle contractions and impairment of controlling brain functions. Consequences may include loss of movement, contraction of the lung muscles (breathing stops), and arrhythmia (ventricular fibrillation, heart stops pumping).

Q: What should I do if a person is touching and/ or is in direct contact with electrical voltage?

A: It is important to follow these instructions:

1. Consider your own safety first.
2. Do not touch someone who is in direct contact with electrical voltage.
3. If possible, de-energize the electrical system. Immediately switch OFF the vehicle's ignition or unplug the service connector for the high voltage system.
4. Separate the person or electrical conductor from the power source with a non-conductive object (for example, a wooden plank or broom handle).

Q: What first aid should be given following an electrical accident?

A: If the person is verbally unresponsive:

1. Check pulse and breathing.
2. Call 911 or arrange for someone else to make the call without delay.
3. Perform artificial respiration and CPR until EMS arrives.
4. If it appears that the person has stopped breathing or their heart is in distress, use an automated external defibrillator (AED) to quickly diagnose and treat them. AEDs are simple to use, with their proper use taught in first aid and CPR classes.

The AED will only supply a shock to the patient if it detects an abnormal or no heartbeat, and can return the patient to a normal heartbeat. Even when the AED is successful, the patient should still be treated by a first responder team.

If the person is verbally responsive:

1. Cool any burns and cover with a sterile lintfree dressing.
2. The person must be examined by a doctor to help prevent after effects.

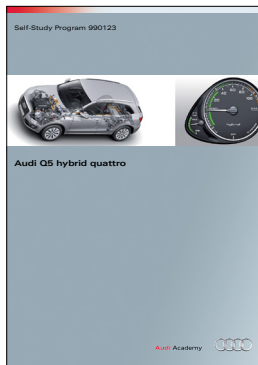
Q: What should I do in the event of an accident involving batteries or battery contents?

A: It is important to follow these instructions:

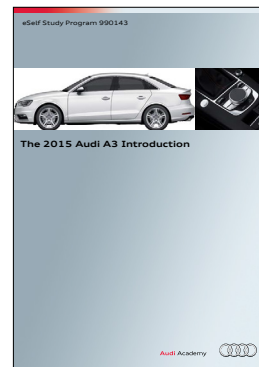
1. If skin contact occurs, rinse well with water.
2. In the case of gas inhalation, move the person to fresh air.
3. If eye contact occurs, rinse with plenty of water (for at least 10 minutes).
4. If battery contents are swallowed, the person should drink plenty of water, but not so much that vomiting is induced.
5. Seek medical treatment.

Self-study programs

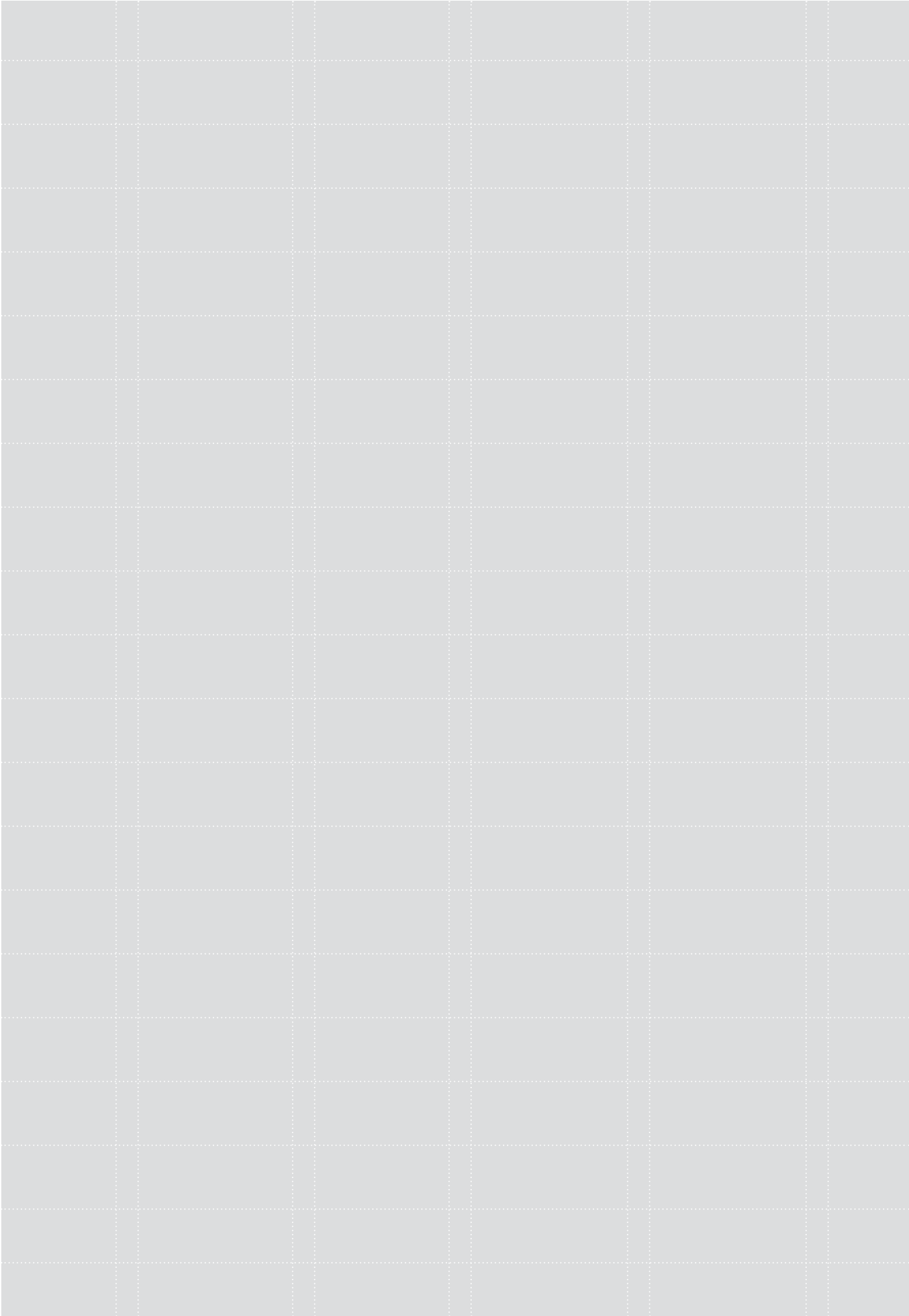
For more information please refer to the following Self-study programs.



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[Audi Q5 Hybrid quattro](#)



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Knowledge assessment

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

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You can find this Knowledge Assessment at:

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From the accessaudi.com Homepage:

- ▶ Click on the “ACADEMY” tab
- ▶ Click on the “Academy site” link
- ▶ Click on the Course Catalog Search and select “600285 - The 2016 Audi Sportback e-tron”

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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