

Service Training



Self-study Programme 550

The Passat GTE

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The Passat GTE – with plug-in hybrid drive for saloon and estate models

For the first time, the Passat drive system is made up of the following innovative components: TSI engine, electric drive, dual clutch gearbox and high-voltage battery.

Together, the 1.4-l TSI engine and the electric drive deliver a system output of 160 kW and produce a maximum torque of 400 Nm.

By pressing the button for electric drive (E-MODE), you can select an all-electric driving mode. The sports program button (GTE mode) activates a mode that engages the TSI engine.

The electric range is up to 50 kilometres.

Combined with the TSI engine, the car has a range of up to 1,114 kilometres when the 50-litre fuel tank is full and the high-voltage battery is fully charged.

The maximum speed is 130 km/h when the car is driven with the electric drive.

You will find more information on and descriptions of the technology in the Passat GTE over the next pages of this Self-study Programme.



S550_002

The Self-study Programme shows the design and function of new developments. The contents will not be updated.

For current testing, adjustment and repair instructions, refer to the relevant service literature.



**Important
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Contents



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Introduction

The production and drive strategy

At Volkswagen, the term "Think Blue." refers to responsibility for both people and the environment.

This includes the efficiency technology that is used in our vehicles – from low-consumption and low-emissions diesel or petrol engines and numerous fuel-saving technologies to the particularly efficient BlueMotion models, hybrids and pure electric vehicles.

The innovative production system created with the modular transverse matrix (MQB) allows the different drive types for the Passat to be produced on one assembly line.

We are thus able to meet individual mobility requirements and customer wishes in the different regions of the world.

The range of vehicles with plug-in hybrid and electric drives will allow us to respond faster and with more flexibility to changing emission standards and new laws on zero-emission mobility in cities.

Our motivation, aspiration and objective is CO₂-neutral, sustainable and safe electric mobility that is suitable for everyday use.



You will find further information on electric mobility on the Internet at:

<http://volkswagen.com/emobility>

<http://volkswagen.com/thinkblue>

Product features of the Passat GTE

The illustration shows significant product features for the Passat GTE. They may vary according to country and equipment level.

- 1.4-l 115-kW TSI engine

- Electric drive
85 kW/330 Nm



- LED headlights

- Lithium-ion high-voltage battery

- Charging socket for high-voltage system next to Volkswagen badge in radiator grille

- Six-speed dual clutch gearbox

- LED tail light cluster



S550_037



Introduction

Product features of the Passat GTE

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LED headlights with blue trim strip and GTE badge on radiator grille



Charging socket integrated into radiator grille

LED daytime running lights in front bumper



Trapezoidal tailpipe trims



GTE badges on front wings at height of character line



17" alloy wheels with GTE-specific design

S550_066



Dash panel insert with GTE-specific gauges



Door trim with blue light strip



Sport program button (GTE mode) and button for electric drive (E-MODE) next to selector lever



S550_067

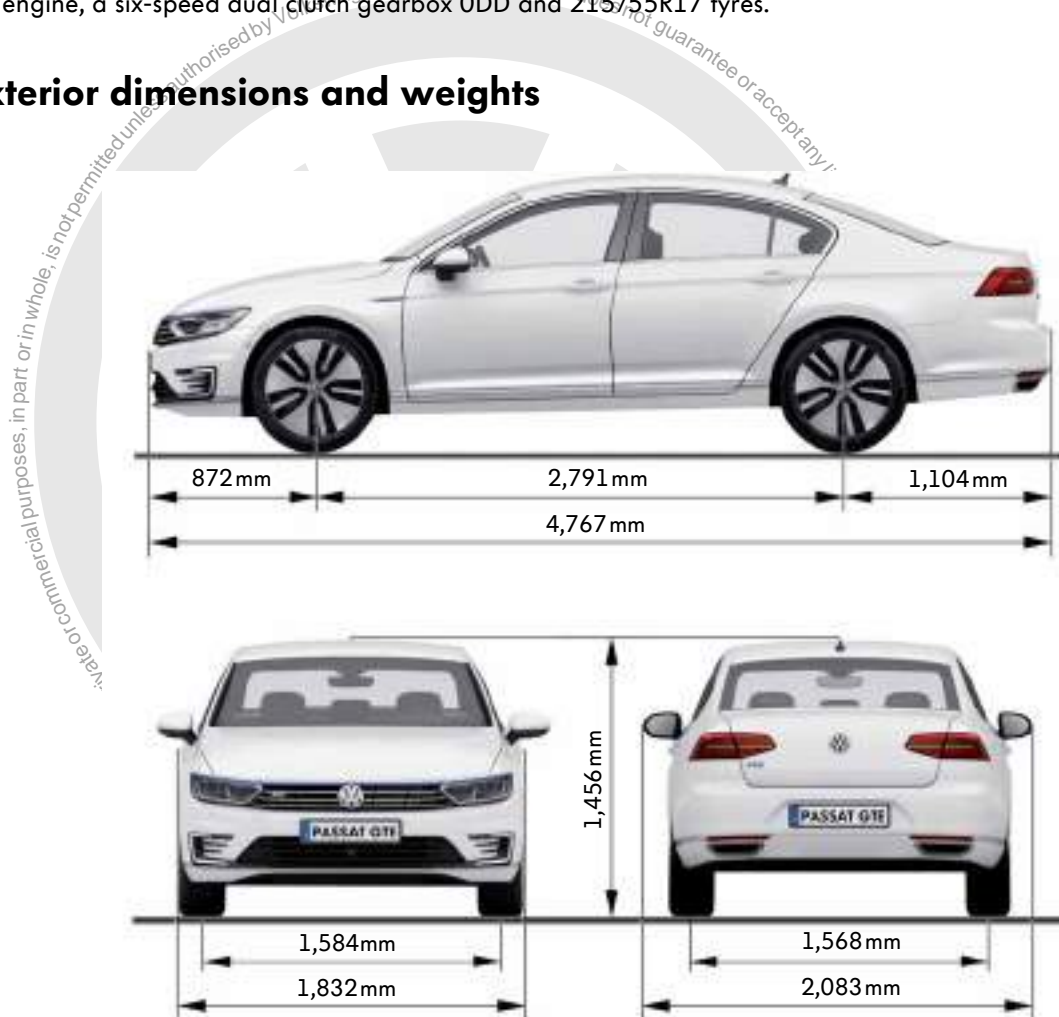
GTE-specific, blue decorative stitching

Introduction

Technical data

The data for the Passat Saloon GTE is based on a vehicle without driver, with standard equipment, a 1.4-l 115-kW TSI engine, a six-speed dual clutch gearbox ODD and 215/55R17 tyres.

Exterior dimensions and weights



S550_058

Exterior dimensions/weights

Length	4,767 mm
Width incl. exterior mirrors	2,083 mm
Height	1,456 mm
Wheelbase	2,791 mm
Track width at front	1,584 mm
Track width at rear	1,568 mm
Gross vehicle weight rating	2,200 kg
DIN* kerb weight	1,647 kg
Weight of the high-voltage battery	125 kg

* DIN \triangleq **D**eutsche **I**ndustrie **N**orm
(German Industry Standard)

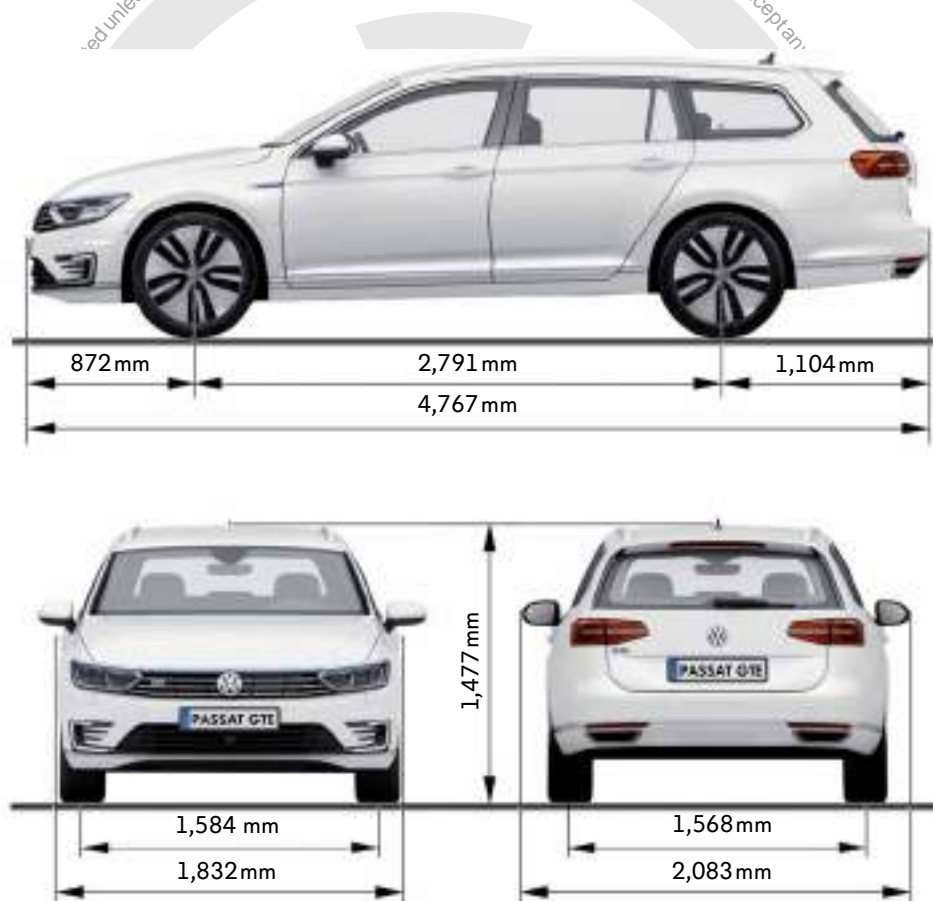
** When both power units accelerate together, the maximum torque of the gearbox, which is 400 Nm, is not exceeded.

General data

Max. output/max. torque of combustion engine	115 kW/250 Nm
Max. output/max. torque of electric drive	85 kW/330 Nm
Max. output/max. torque of complete system **	160 kW/400 Nm
Capacity of high-voltage battery	9.9 kWh
Fuel tank capacity	50 l
Turning circle	11.7 m
Drag coefficient	0.282 c_d
Max. trailer weight (braked) on 12% downhill gradient	1,600 kg
Max. roof load	100 kg

The data for the Passat Estate GTE is based on a vehicle without driver, with standard equipment, a 1.4-l 115-kW TSI engine, a six-speed dual clutch gearbox DDD and 215/55R17 tyres.

Exterior dimensions and weights



S550_059

Exterior dimensions/weights

Length	4,767 mm
Width incl. exterior mirrors	2,083 mm
Height	1,477 mm
Wheelbase	2,791 mm
Track width at front	1,584 mm
Track width at rear	1,568 mm
Gross vehicle weight rating	2,250 kg
DIN* kerb weight	1,660 kg
Weight of the high-voltage battery	125 kg

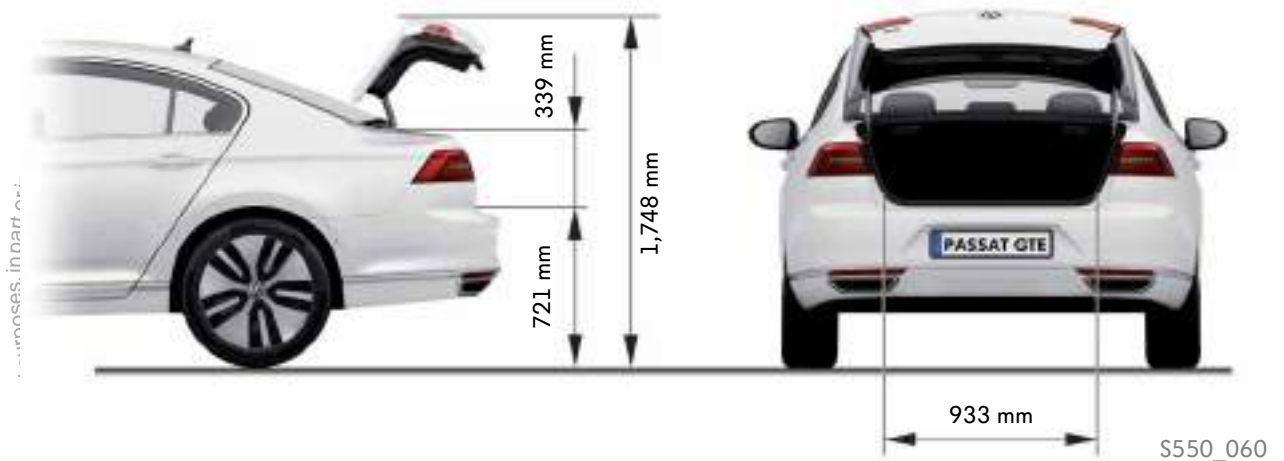
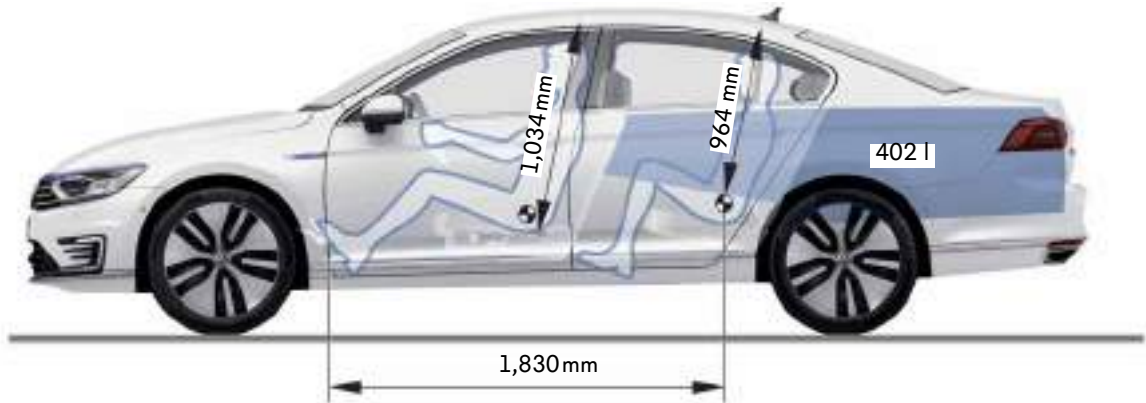
General data

Max. output/max. torque of combustion engine	115 kW/250 Nm
Max. output/max. torque of electric drive	85 kW/330 Nm
Max. output/max. torque of complete system **	160 kW/400 Nm
Capacity of high-voltage battery	9.9 kWh
Fuel tank capacity	50 l
Turning circle	11.7 m
Drag coefficient	0.292 c _d
Max. trailer weight (braked) on 12% downhill gradient	1,600 kg
Max. roof load	100 kg



Introduction

Interior dimensions and volumes

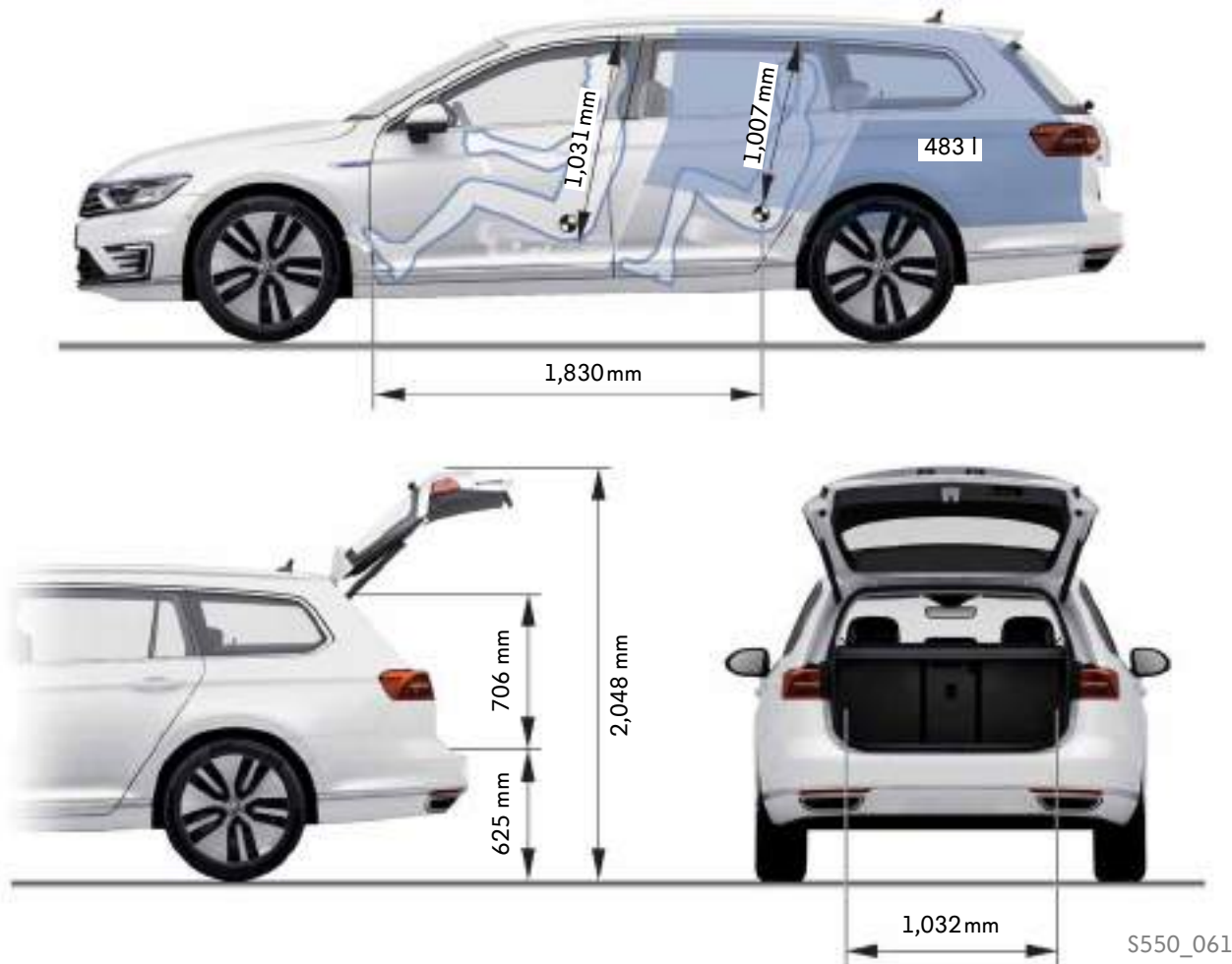


Interior dimensions and volumes

Interior length	1,830 mm
Front max. headroom	1,034 mm
Headroom, second seat row	964 mm
Knee room, second seat row	116 mm
Luggage compartment volume	402 l
Luggage compartment volume with rear seat backrest folded down	968 l

Height of open tailgate	1,748 mm
Height of load sill	721 mm
Height of luggage compartment aperture	339 mm
Width of luggage compartment aperture at bottom	933 mm
Through-load width between wheel housings	1,005 mm

Interior dimensions and volumes



S550_061

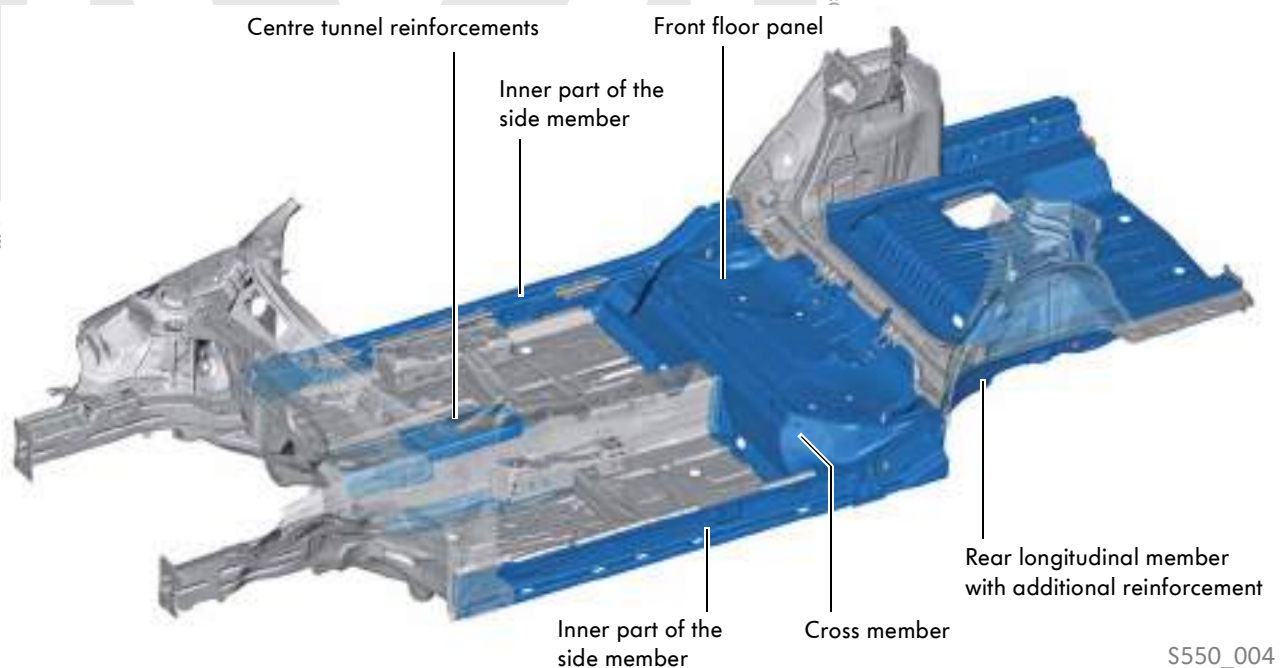
Interior dimensions and volumes

Interior length	1,830 mm
Front max. headroom	1,031 mm
Headroom, second seat row	1,007 mm
Knee room, second seat row	116 mm
Luggage compartment volume	483 l
Luggage compartment volume with rear seat backrest folded down	1,613 l

Height of open tailgate	2,048 mm
Height of load sill	625 mm
Height of luggage compartment aperture	706 mm
Width of luggage compartment aperture at bottom	1,032 mm
Through-load width between wheel housings	1,005 mm

Body structure

The Passat GTE body is based on the Passat 2015 body. The floor panel (MQB-B) has been adapted to accommodate the repositioned fuel tank and the high-voltage battery. The rear longitudinal member has been reinforced to protect the high-voltage battery in crashes. Furthermore the material thickness of the inner side members has been increased to 2 mm. The cross members under the underbody have been adapted to allow the high-voltage battery to be fastened to the underbody. Additional reinforcements have been welded to the front section of the centre tunnel to provide protection in frontal collisions.



The components that have changed compared with the Passat 2015 body are coloured in the illustration.

The components are as follows:

- Centre tunnel reinforcements
- Inner part of the side member
- Front section of luggage compartment floor with cross member
- Rear section of luggage compartment floor including right-side floor panel
- Cross member on floor
- Rear longitudinal member with additional reinforcements

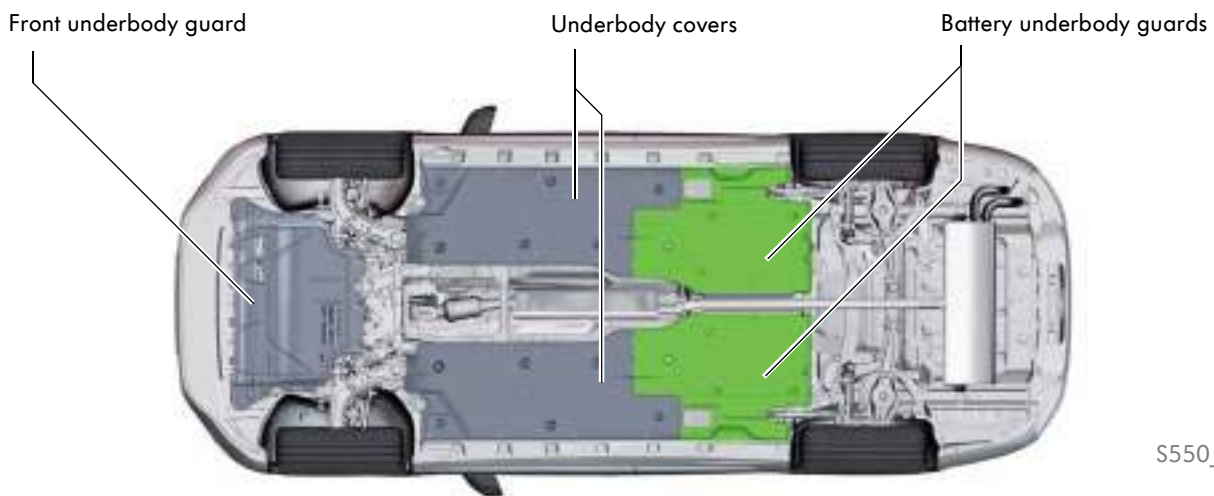


You will find further information on the body structure in Self-study Programme no. 544 "The Passat 2015 – Body and Occupant Protection".

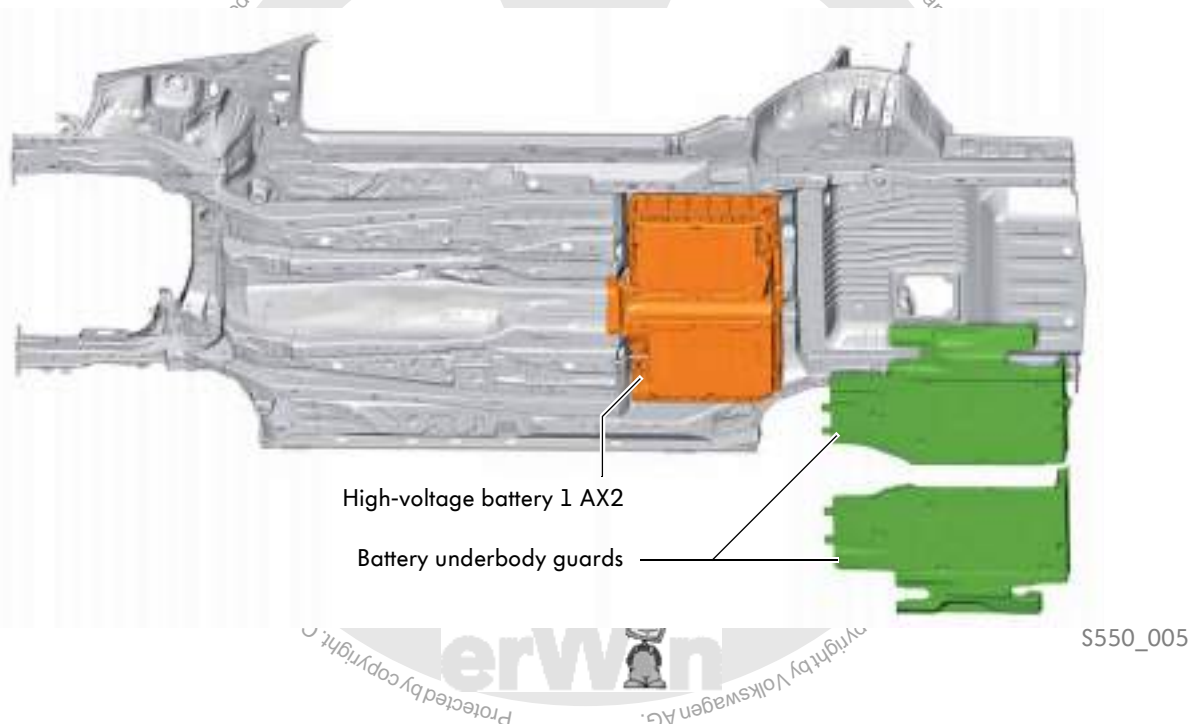
Battery protection

Protection for high-voltage battery and c_d underbody cover

The front section of the underbody has an underbody guard and two underbody covers in the centre to improve the c_d figure. These two features improve the car's aerodynamics. They also protect the underbody against external damage.



The battery protection of the body consists of the battery underbody guards. The battery underbody guards are made of four different materials sandwiched together. This combination is necessary due to the proximity to the exhaust system and the possibility of major temperature fluctuations.



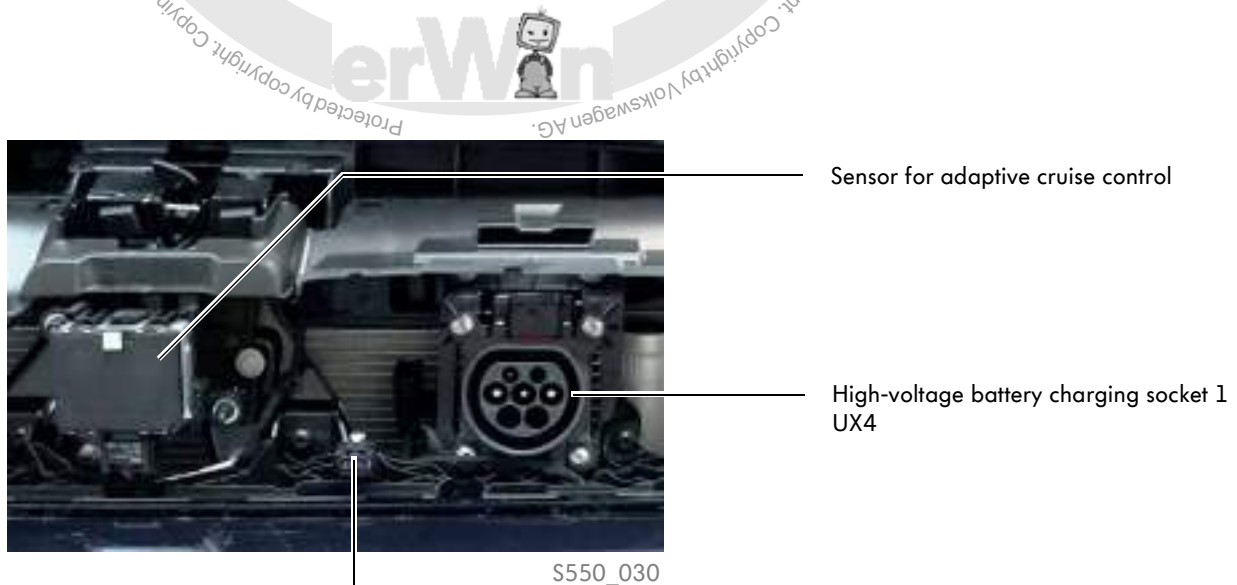
Body

Charging socket

The charging socket for the high-voltage battery is mounted on the lock carrier in the Passat GTE. There is a flap in the radiator grille to charge the vehicle from an electric power source. It is unlocked and locked via the central locking system. Once the flap has been unlocked, it can be opened or closed with the so-called “push-push function”. The module container with the flap and the clip-on radiator grille trim is part of the radiator grille.



The charging socket for the high-voltage battery has been placed to the left behind the radiator grille because the sensor for adaptive cruise control is located behind the Volkswagen badge on the Passat 2015. The charging socket is secured to an additional bracket. This bracket is bolted to the lock carrier and the cross member. The Passat GTE therefore has a separate cross member.



Connector for actuator for high-voltage charging connector lock

Safety equipment

As with the Passat 2015, the following safety equipment is available for the Passat GTE:

- Single-stage driver airbag and front passenger airbag with deactivation switch
- Knee airbag on the driver's side
- Curtain airbag system for driver and front passenger
- Front side airbags in the front seats
- Rear side airbags in conjunction with pyrotechnical belt tensioners
- Three-point automatic seat belts at the front with height adjusters and belt tensioners (ball return system)
- Acceleration-resistant belt buckles
- Three three-point automatic seat belts in the rear
- Seat belt request incl. acoustic warning and warning lamp
- Proactive occupant protection system incl. reversible front belt tensioners
- Top tether
- Multicollision brake
- Positive terminal pyrotechnical disconnection



S550_007



You will find further information on occupant protection in Self-study Programme no. 544 "The Passat 2015 – Body and Occupant Protection".

Power units

The 1.4-l 115-kW TSI engine

The 1.4-l 115-kW TSI engine corresponds with the 1.4-l 110-kW TSI engine in the Golf GTE to a great extent. The engine mechanics have been adapted for the increased output and to further reduce friction.

Adaptations compared with the Golf GTE

- Plasma-coated and torque-plate honed cylinder walls to reduce friction
- The pistons have a ring carrier made of high-strength cast iron to increase the wear-resistance of the first piston ring groove
- Sodium-filled exhaust valves for improved heat dissipation
- Upper conrod bearing shell in the form of a three-material bearing to increase wear protection



S550_049

Further technical features

- Piston-in-cylinder clearance adapted to cylinder block to reduce noise, blow-by gases and friction
- Crankshaft bearings have a special coating to reduce wear
- Piston rings 1 and 3 have a coating to reduce wear and friction
- Piston pin boss with lubrication bores
- Cylinder block with reduced cooling jacket depth

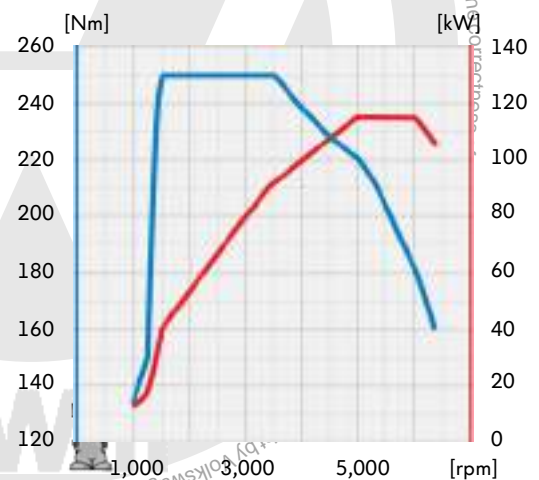


You will find further information about this engine family in Self-study Programme no. 511 “The New EA211 Petrol Engine Family”.

Technical data

Engine code	CUKC
Type	Four-cylinder in-line engine
Displacement	1,395 cm ³
Bore	74.5 mm
Stroke	80 mm
Valves per cylinder	4
Compression ratio	10.0:1
Max. output	115 kW at 5,000–6,000 rpm
Max. torque	250 Nm at 1,600 to 3,500 rpm
Engine management system	Bosch MED 17.1.21
Fuel	Super unleaded RON 95
Exhaust gas treatment	Three-way catalytic converter with one upstream broadband lambda probe and one downstream step-type lambda probe
Emission standard	EU6

Torque and power diagram



S550_071

Thermal management system

The thermal management system ensures that the components quickly reach their respective operating temperatures. The basic set-up consists of the high-temperature circuit for the engine and the low-temperature circuit for the charge air cooling system.

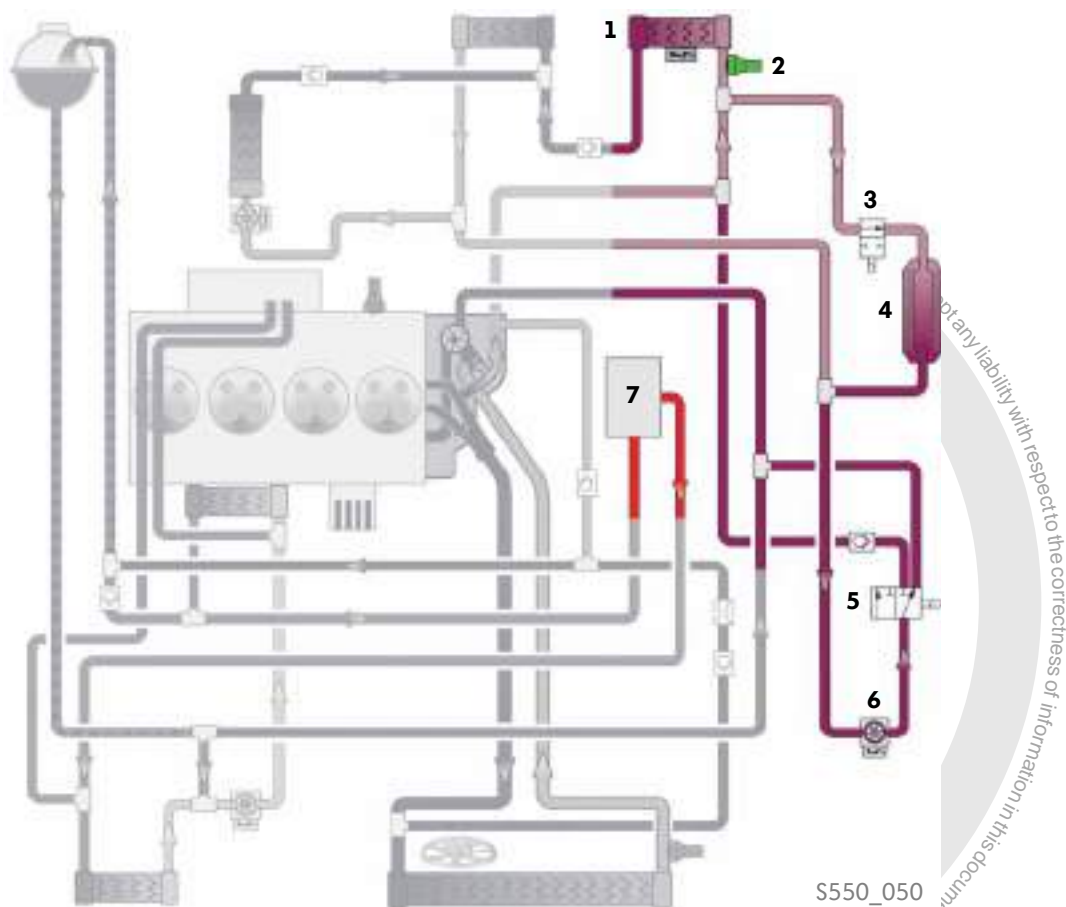
The following adaptations have been made for the plug-in hybrid drive.

The engine cooling system has these additional components:



- 1 High-voltage heater (PTC) Z115
- 2 Coolant temperature sender for heater G241
- 3 Coolant valve for gearbox N488
- 4 Gear oil cooler
- 5 Coolant changeover valve 2 N633
- 6 Coolant pump for high-temperature circuit V467

The charge air cooling system has these additional components:

- 7 Three-phase current drive VX54 with electric drive motor V141



Key

-  Engine cooling system (high-temperature circuit)
-  Charge air cooling system (low-temperature circuit)

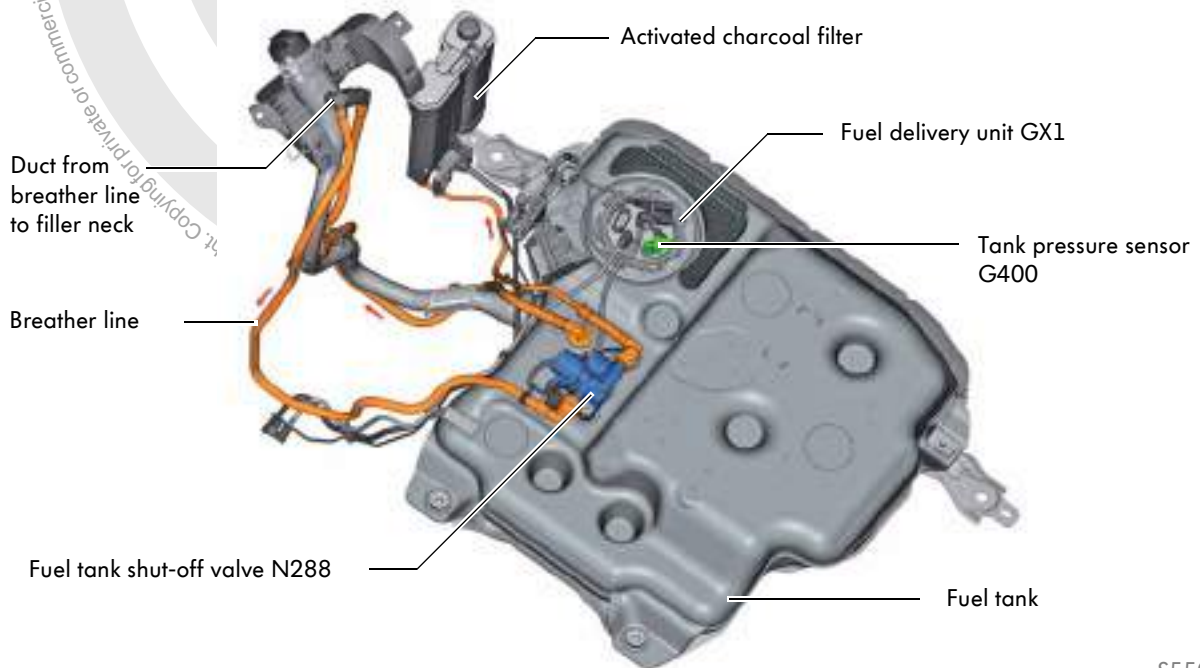


Fuel tank

Hydrocarbons are vented from the fuel tank as a result of the fuel being warmed (ambient and vehicle temperatures). In conventional vehicles, the vented fuel vapours are stored in the activated charcoal filter via a breather line and are fed into the air intake as required. Since this process is constantly repeated, there is no risk of hydrocarbons being released into the environment.

The Passat GTE can also be driven with the electric drive over very long periods. In this case, the vented fuel vapours are stored in the activated charcoal filter until it is saturated. If it is not emptied, it will reach its storage limit and hydrocarbons could be released into the environment. A gas-tight, sealable fuel tank is used to prevent this.

Gas-tight, sealable fuel tank



S550_078

Fuel tank shut-off valve N288

The fuel tank shut-off valve is closed when not energised. When it is energised by the engine control unit, it opens the line from the fuel tank to the activated charcoal filter. If the pressure in the fuel tank increases by 320 mbar or falls by 110 mbar compared with atmospheric pressure, the fuel tank shut-off valve will mechanically open the path to the activated charcoal filter.

Tank pressure sensor G400

The tank pressure sensor is mounted on the fuel delivery unit and measures the pressure in the fuel tank.

Preparing for refuelling

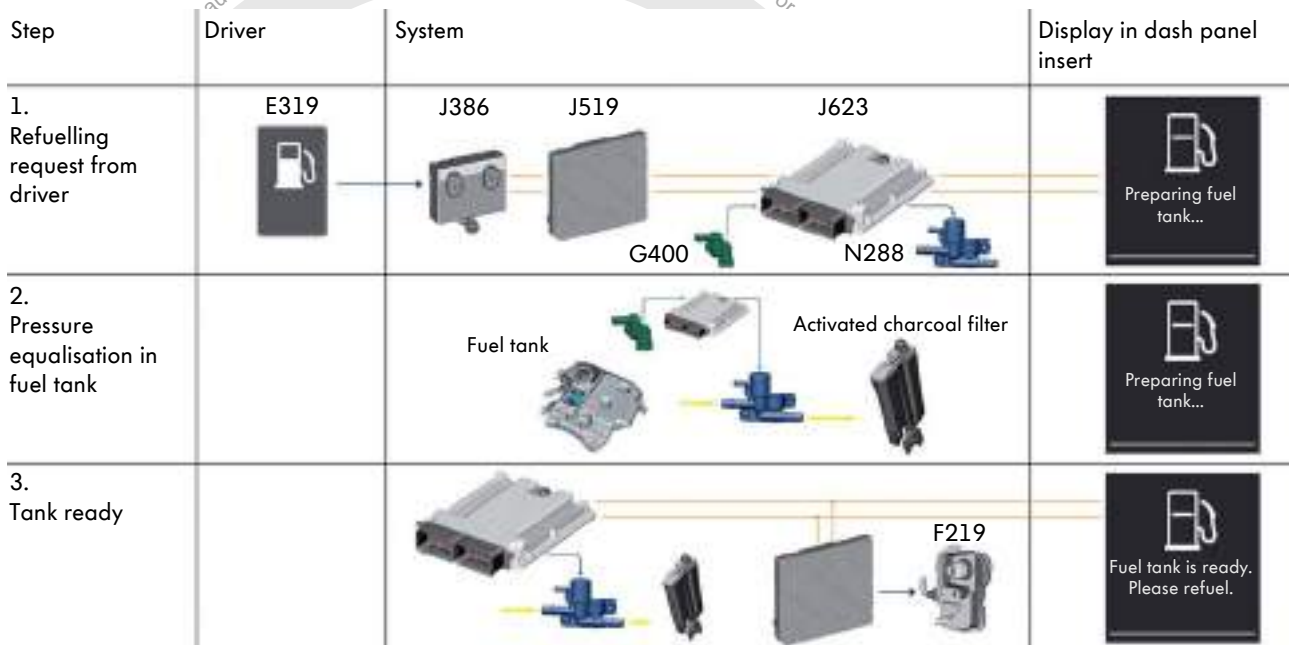
Before you can fill the tank with fuel, the pressure in the fuel tank first needs to be equalised. This prevents fuel vapours escaping through the fuel filler neck.

Preparation procedure for refuelling

The vehicle can not be travelling at a speed greater than 14 km/h when you prepare it for refuelling.

1. Press the fuel tank flap release button and the engine control unit will be informed about your intention to refuel via the driver door control unit and by the onboard supply control unit. You will see a message in the instrument cluster that the car is being prepared for refuelling.
2. The engine control unit activates the fuel tank shut-off valve and opens the line from the fuel tank to the activated charcoal filter. The vapours flow to the activated charcoal filter. The pressure equalisation is monitored by the tank pressure sensor.
3. The onboard supply control unit opens the fuel filler flap once the pressure has been successfully lowered. A message appears in the instrument cluster informing you that the vehicle is ready for refuelling.

It normally takes between 0.5 and 7 seconds to prepare for refuelling. The vehicle will then remain ready for up to 17 minutes.



Key

E319	Fuel tank flap release button	J519	Onboard supply control unit
F219	Fuel tank filler flap central locking actuator	J623	Engine control unit
G400	Tank pressure sensor	N288	Fuel tank shut-off valve
J386	Driver door control unit		

S550_051



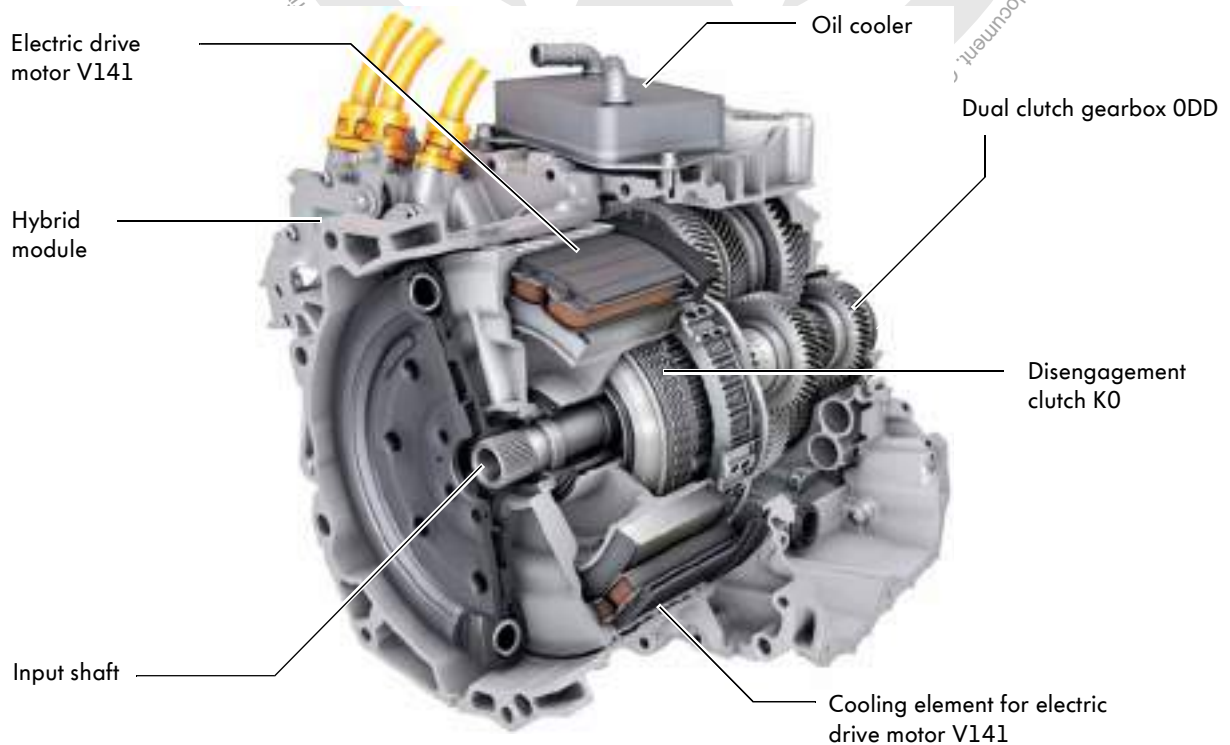
Power transmission

The six-speed dual clutch gearbox ODD

The Passat GTE comes with the dual clutch gearbox ODD. This gearbox was used for the first time in the Golf GTE and has been specially developed for hybrid vehicles.

The dual clutch gearbox has three multi-plate clutches, two drive clutches and a disengagement clutch. The two clutches K1 and K2 connect the two gear train halves to the electric drive motor V141. The disengagement clutch K0 connects the combustion engine to the electric drive motor V141 or separates them. All three clutches run in oil. When the disengagement clutch K0 is engaged, the Passat GTE can be driven with the combustion engine or together with the electric drive motor V141.

Also, when the disengagement clutch K0 is engaged, the combustion engine is started by the electric drive motor V141.



S550_054

Technical data

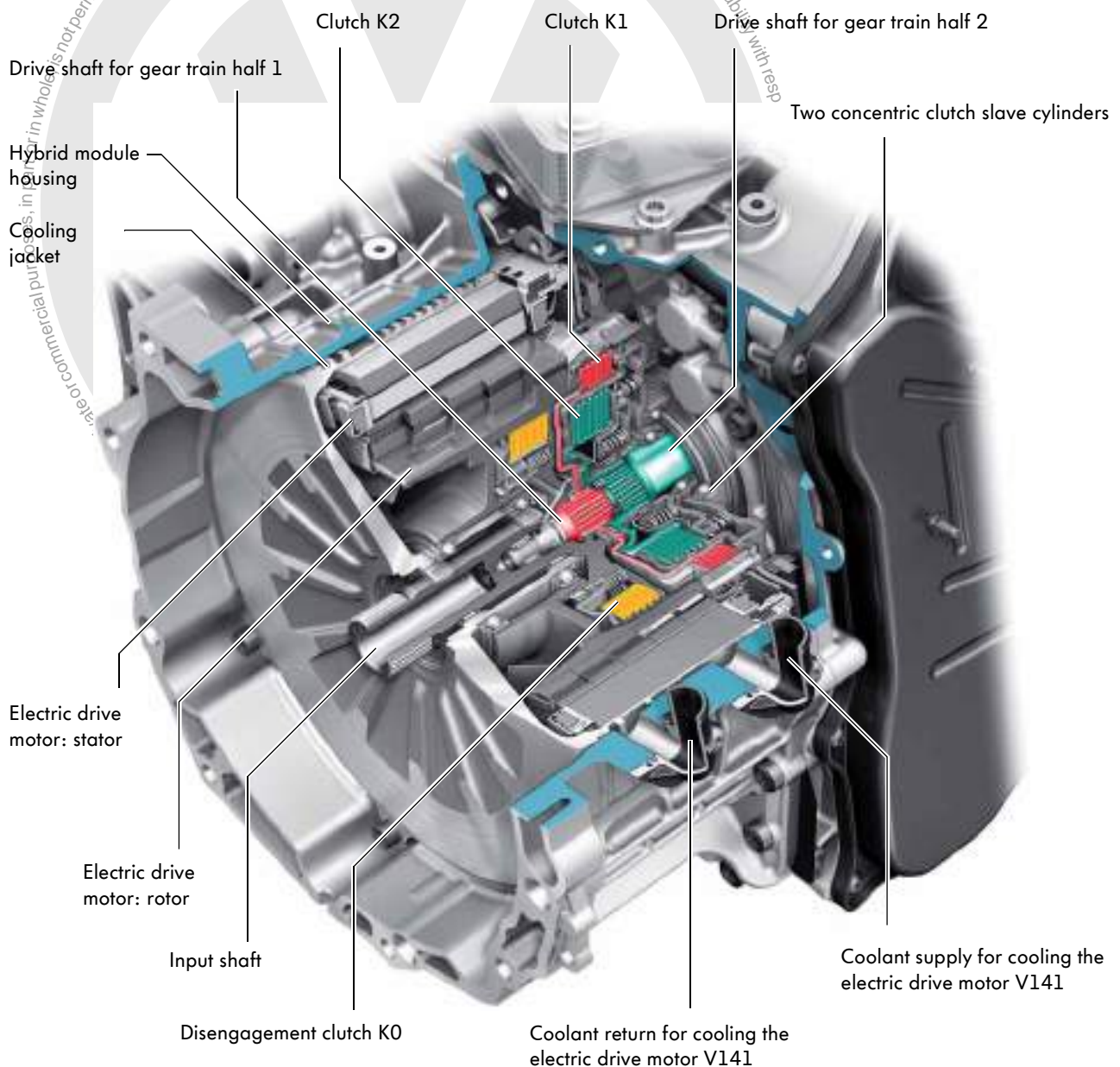
Designation	ODD
Weight of gearbox	93 kg with oil
Weight of dual-mass flywheel	8 kg
Weight of hybrid module	34 kg
Torque	Max. 400 Nm
Gears	6 forward gears, 1 reverse gear

Gear spread	5.42
Operating mode	Automatic and Tiptronic modes
Oil volume for first fill	8.5 litres
Oil change quantity	7.0 litres
Oil change interval	See workshop information.

Hybrid module design

The hybrid module is located inside the gearbox. It consists of the following components:

- Hybrid module housing
- Cooling jacket
- Electric drive motor V141
- Clutch pack



S550_055



You will find further information on the design and function of the dual clutch gearbox ODD in Self-study Programme no. 538 "The 6-speed Dual Clutch Gearbox ODD".

The running gear and the driver assist systems

The illustration shows you the main features of the running gear and the driver assist systems for the Passat. The Passat can be equipped with standard running gear or DCC running gear.

Running gear

- McPherson strut front suspension
- Four-link rear axle
- Electromechanical parking brake (EPB)
- Electromechanical power steering
 - with parallel-axis drive, standard equipment on left-hand drive models
 - with double pinion from ZF, on right-hand drive models
- ABS/ESC - MK100 from Continental
- Electromechanical brake servo (eBS)



You will find more information on the steering systems in the following Self-study Programmes:
no. 317 “The electromechanical power steering with double pinion”
no. 399 “Electromechanical Steering with Parallel-axis Drive”.

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Driver assist systems

- Area monitoring system – FRONT ASSIST
 - City Emergency Braking function
 - Pedestrian detection
- Adaptive cruise control (ACC)
- Lane departure warning system - LANE ASSIST
 - EMERGENCY ASSIST
 - TRAFFIC JAM ASSIST
- Lane change assist system – SIDE ASSIST
 - Assist system for reversing out of parking spaces – TRAFFIC ALERT
- Park Assist (PLA 3.0)
- Trailer manoeuvring system – TRAILER ASSIST
- Overhead view camera – AREA VIEW
- Tyre Pressure Loss Indicator (TPLI)
- Tyre Pressure Monitoring System
- Multicollision brake (Automatic Post-Collision Braking System)
- Driver alert system (DAS)
- Reversing camera system (Rear View)



S550_008

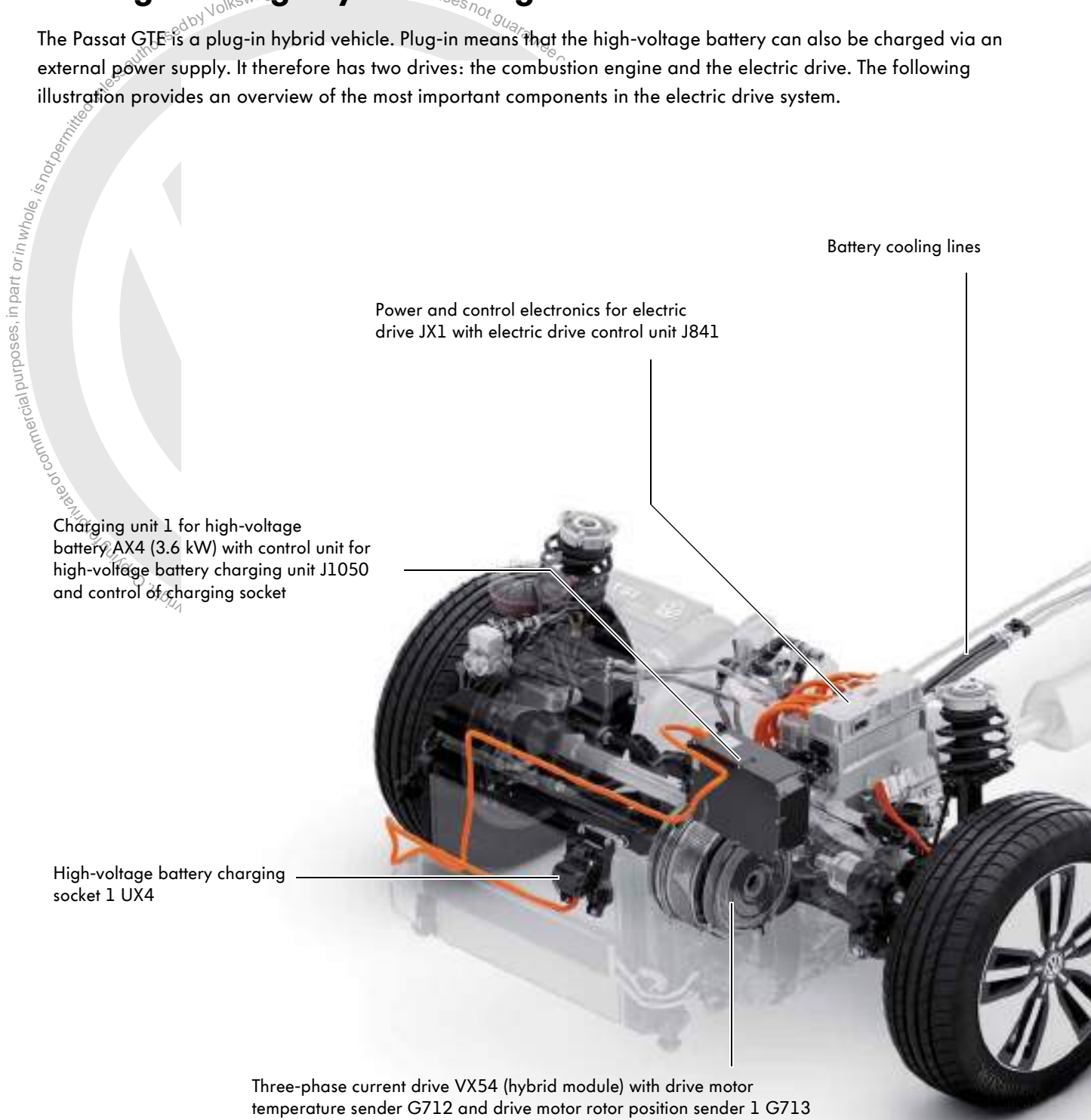


You will find further information on the driver assist systems in Self-study Programme no. 543 “The Passat 2015 – Driver Assist Systems”.

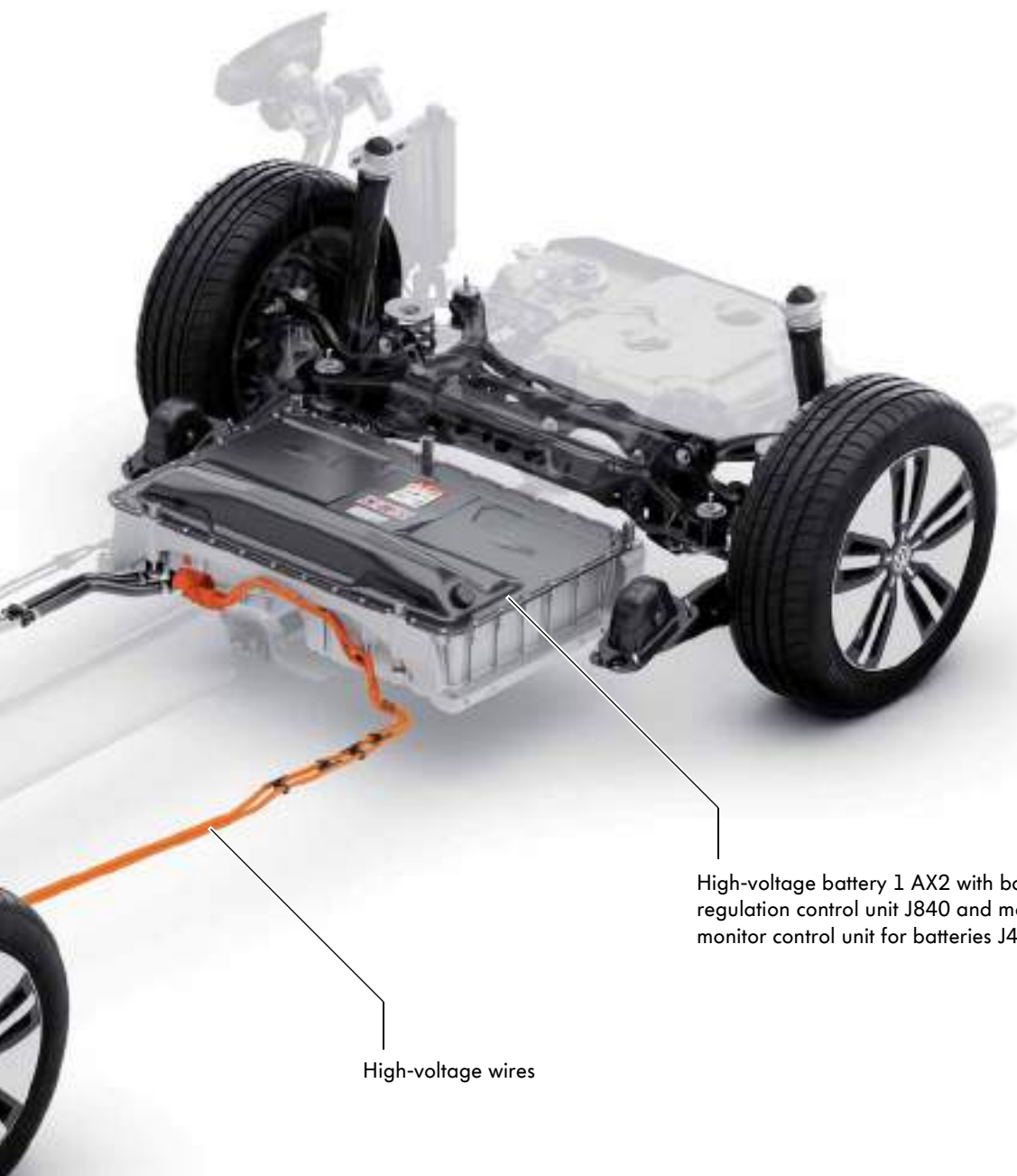
High-voltage system

The high-voltage system at a glance

The Passat GTE is a plug-in hybrid vehicle. Plug-in means that the high-voltage battery can also be charged via an external power supply. It therefore has two drives: the combustion engine and the electric drive. The following illustration provides an overview of the most important components in the electric drive system.



You will find information on the warning notices in Self-study Programmes no. 525 “The Jetta Hybrid”, no. 527 “The e-up!” and no. 530 “The e-Golf”.



S550_010

High-voltage wires

High-voltage battery 1 AX2 with battery regulation control unit J840 and module monitor control unit for batteries J497



Caution! Dangerous electric voltage!

Please note that work on the electric vehicle may be carried out only by qualified personnel. Improper handling of the high-voltage equipment may lead to life-threatening situations. AC voltages of 30 volts or more and DC voltages of 60 volts or more are extremely dangerous for humans. Therefore, please observe the safety information in the service literature, the vehicle diagnostic tester and on the vehicle itself.

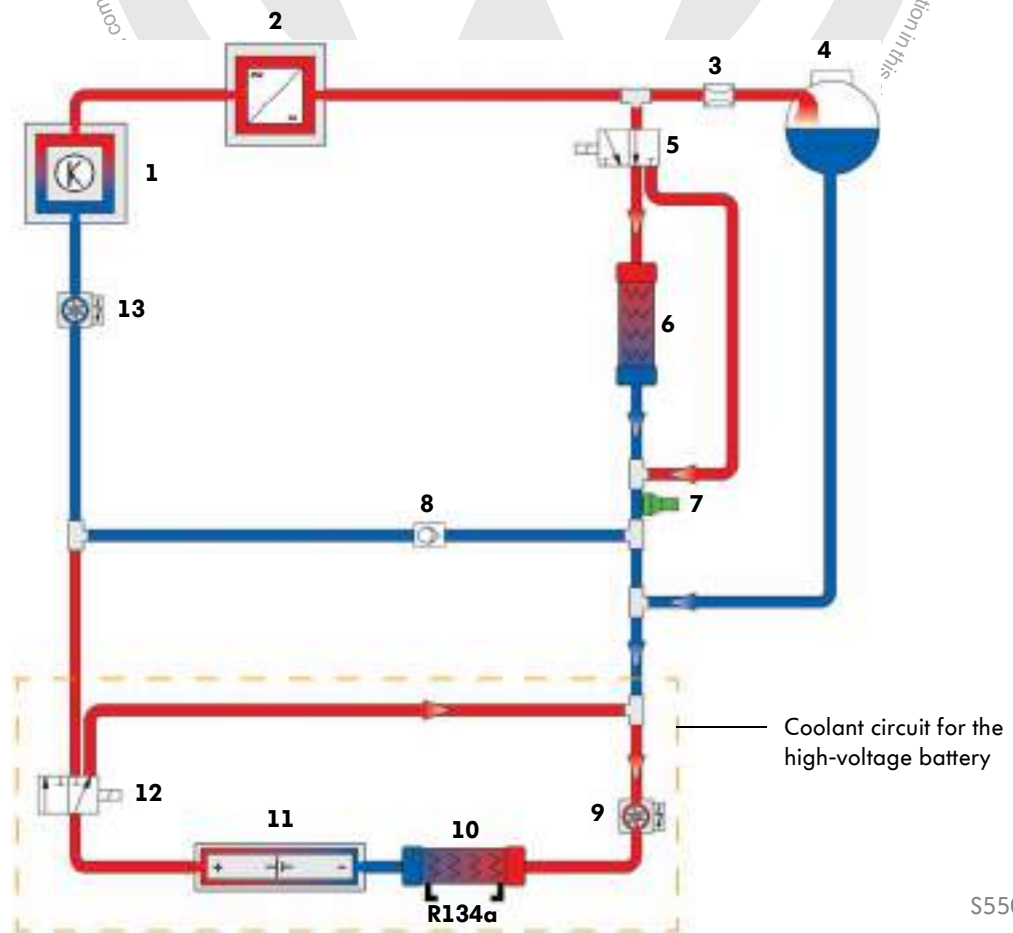
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Coolant circuit for high-voltage components

The following high-voltage components are cooled via a separate low-temperature circuit:

- Power and control electronics (1)
- Battery charger (2)
- High-voltage battery (10)

The coolant circuit can be separated into two independent circuits by the coolant valve for high-voltage battery N688 (12). When the circuit is separated, the high-voltage battery is cooled by the heat exchanger for high-voltage battery VX63 (10). The heat exchanger is connected in parallel to the refrigerant circuit.



S550_011

Key

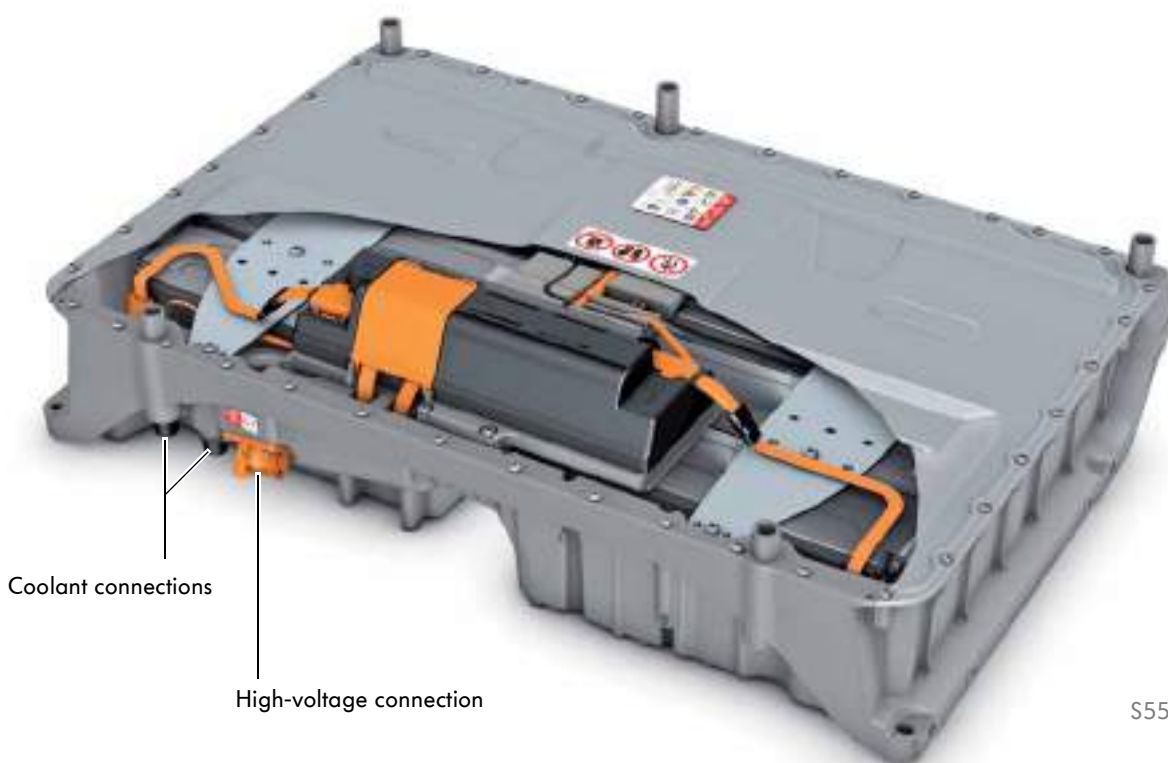
- | | | | |
|----------|--|-----------|---|
| 1 | Power and control electronics for electric drive JX1 | 8 | Non-return valve |
| 2 | Charging unit 1 for high-voltage battery AX4 | 9 | Coolant pump for high-voltage battery V590 |
| 3 | Restrictor | 10 | Heat exchanger for high-voltage battery VX63 |
| 4 | Coolant expansion tank | 11 | Cooling element for high-voltage battery 1 AX2 |
| 5 | Coolant changeover valve 1 N632 | 12 | Coolant valve for high-voltage battery N688 |
| 6 | Low-temperature radiator | 13 | Coolant circulation pump before power and control electronics for electric drive V508 |
| 7 | Temperature sensor | | |

High-voltage battery 1 AX2

The high-voltage battery in the Passat GTE is identical to the battery in the Golf GTE in terms of its mounting on the body and the electrical connections. The capacity of the battery cells has been increased from 25 Ah to 28 Ah to achieve the same range and dynamics as the Golf GTE with a greater kerb weight. The space required for the battery cells is the same.

The high-voltage battery is fitted to the underside of the vehicle in front of the rear axle. It supplies the following high-voltage consumers:

- Three-phase current drive VX54
- High-voltage heater Z115
- Electrical air conditioner compressor V470



S550_012

Technical data

Weight	125 kg
Battery technology	Lithium-ion cells
Number of battery cells	96 units
Cell modules	8x12
Capacity	28 Ah
Nominal voltage	345 V
Capacity	9.9 kWh (gross)
Cell voltage	3.6 V (nominal)
Cooling system	Liquid cooling
Operating range	-28°C to 60°C
Protection ratings	IP6K6, IP6K7, IP6K9K

High-voltage system

Design of high-voltage battery 1 AX2

Pressure-equalisation element

Upper housing case (aluminium)

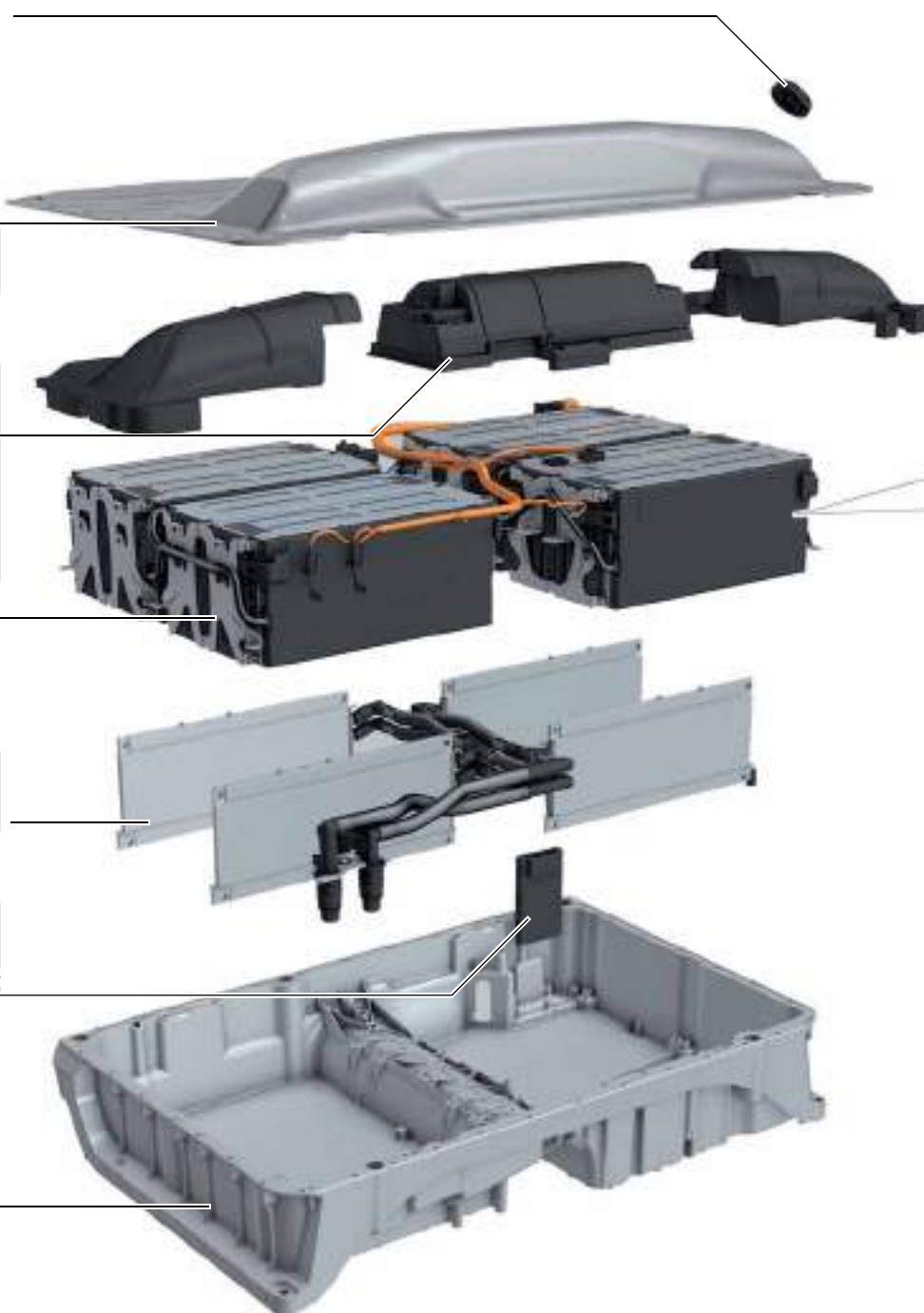
Switching unit for high-voltage battery SX6

Battery modules

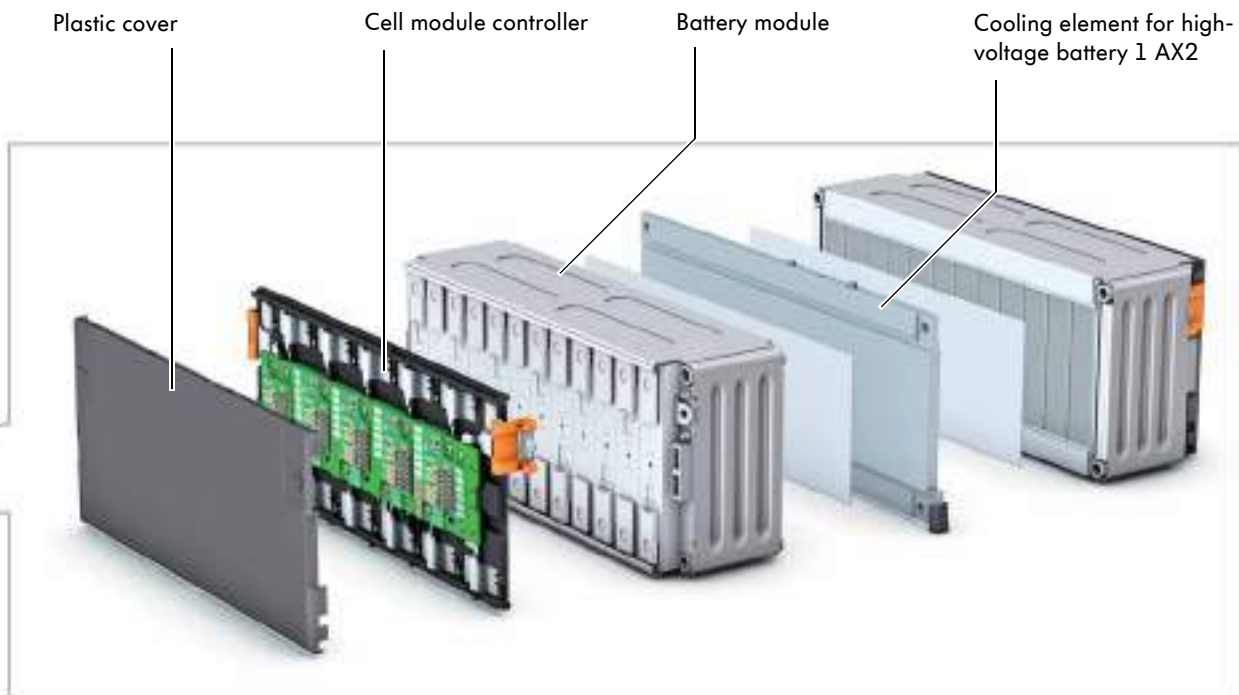
Cooling element for high-voltage battery 1 AX2

Battery regulation control unit J840 and module monitor control unit for batteries J497

Lower housing case (cast aluminium)



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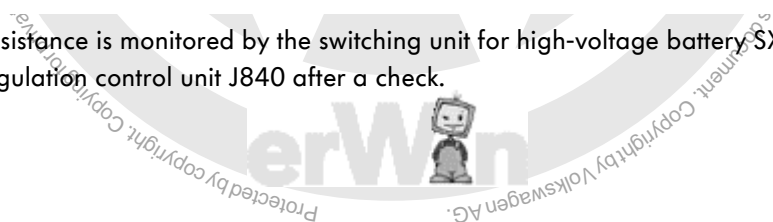


The battery regulation control unit J840 is the master for the switching unit for high-voltage battery SX6.

The battery regulation control unit J840 performs the following functions in conjunction with the switching unit for high-voltage battery SX6:

- Monitoring the pilot line
- Crash signal evaluation
- Temperature regulation of the high-voltage battery
- Control of the blocking relay
- Measuring the voltage before and after the blocking relay
- Evaluation of the current sensor
- Measuring and evaluating the battery voltage
- Measuring and evaluating the cell voltages
- Measuring the temperature of the modules
- Cell balancing
- Insulation resistance monitoring

The insulation resistance is monitored by the switching unit for high-voltage battery SX6. The enable signal is sent to the battery regulation control unit J840 after a check.



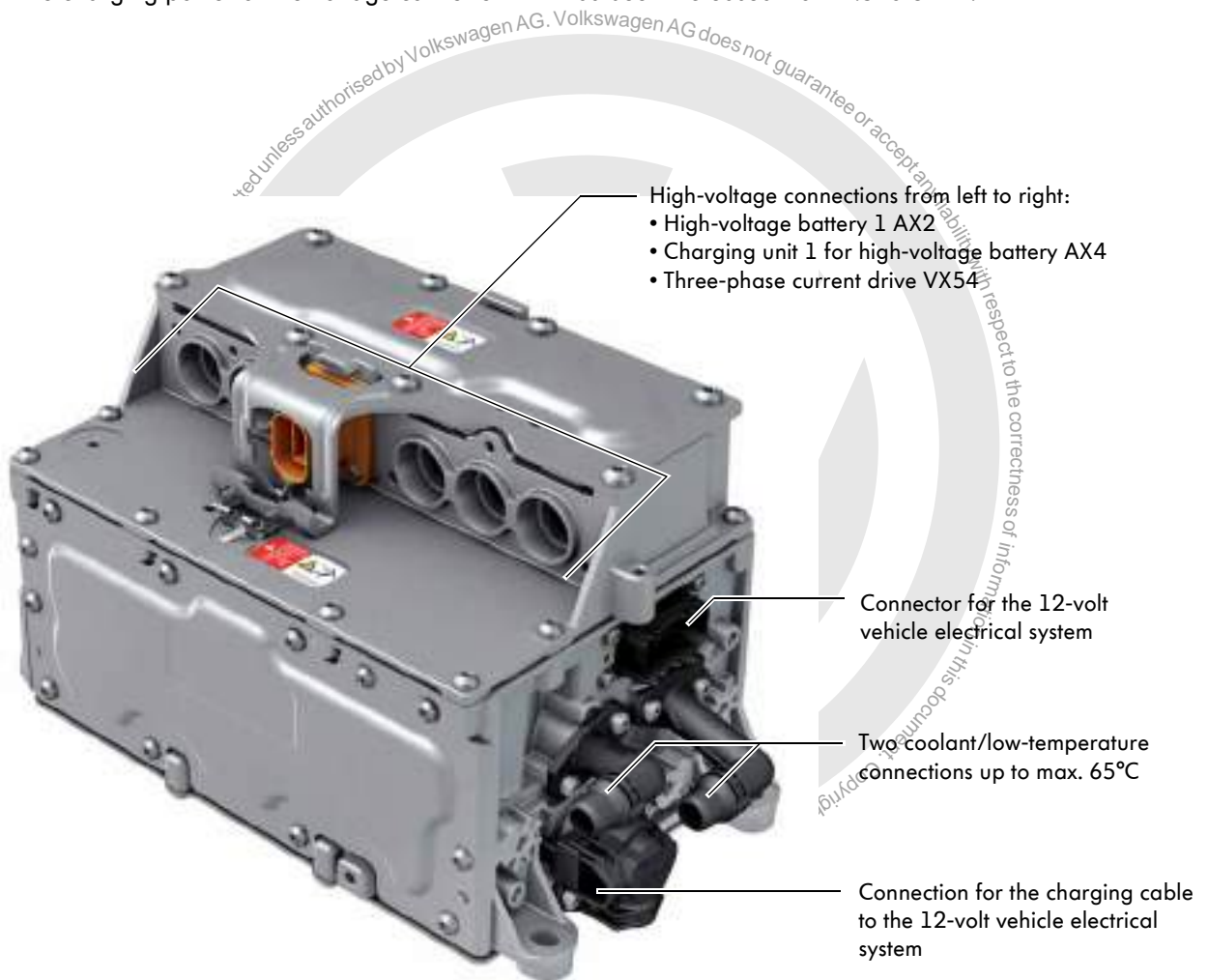
High-voltage system

Power and control electronics for electric drive JX1

This component is installed on the left in the engine compartment. It controls the three-phase current drive VX54, the charging of the 12-volt battery and the supply to the vehicle electrical system. Furthermore it forms the connection between the charging unit 1 for high-voltage battery AX4 and the high-voltage battery 1 AX2.

A new generation of the power and control electronics for electric drive JX1 is used in the Passat GTE. The following changes have been made:

- Improvement of the DC/AC converter for drive motor A37 (high-power transistors). This allows the maximum current of 450 A to flow longer.
- The connections between the intermediate circuit capacitor C25 and the coolant circuit have been optimised.
- The charging power of the voltage converter A19 has been increased from 2.5 to 3 kW.



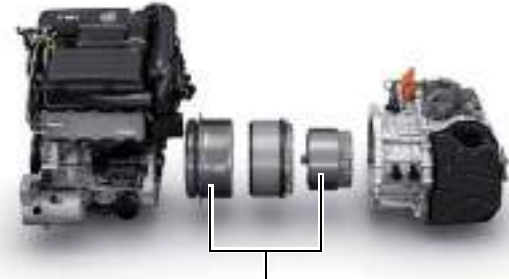
S550_014



You will find further information on the power and control electronics for electric drive JX1 in Self-study Programme no. 530 "The e-Golf".

Three-phase current drive VX54

The electric drive uses a permanent-magnet synchronous motor. It is located between the 1.4-l 115-kW TSI engine and the six-speed dual clutch gearbox. It can act as the sole drive for the vehicle or in combination with the combustion engine. It also performs the tasks of the starter and alternator.



Three-phase current drive VX54

S550_015

Design

The three-phase current drive VX54 consists of the following components:

Cooling element for electric drive motor V141

Electric drive motor V141

Disengagement clutch K0

Stator

Rotor

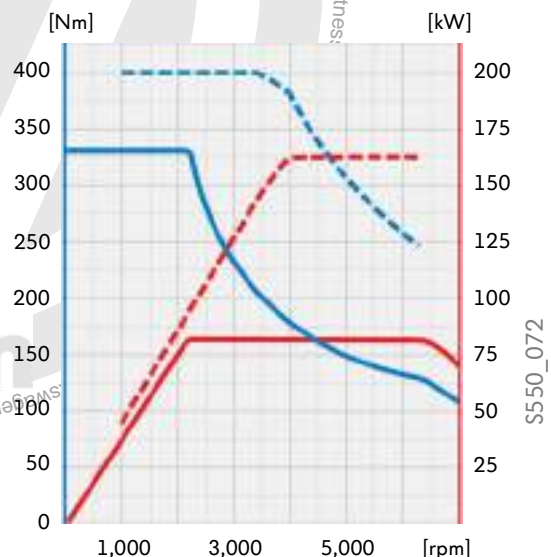
Carrier ring for the drive motor temperature sender G712 and drive motor rotor position sender 1 G713

S550_016

Technical data

Max. output	85 kW
Max. torque	330 Nm
Max. motor speed	7,000 rpm
Weight of electric drive motor	34 kg
Max. system output	160 kW
Max. system torque	400 Nm

Torque and power diagram



System output means that the combustion engine and the three-phase current drive are working together.

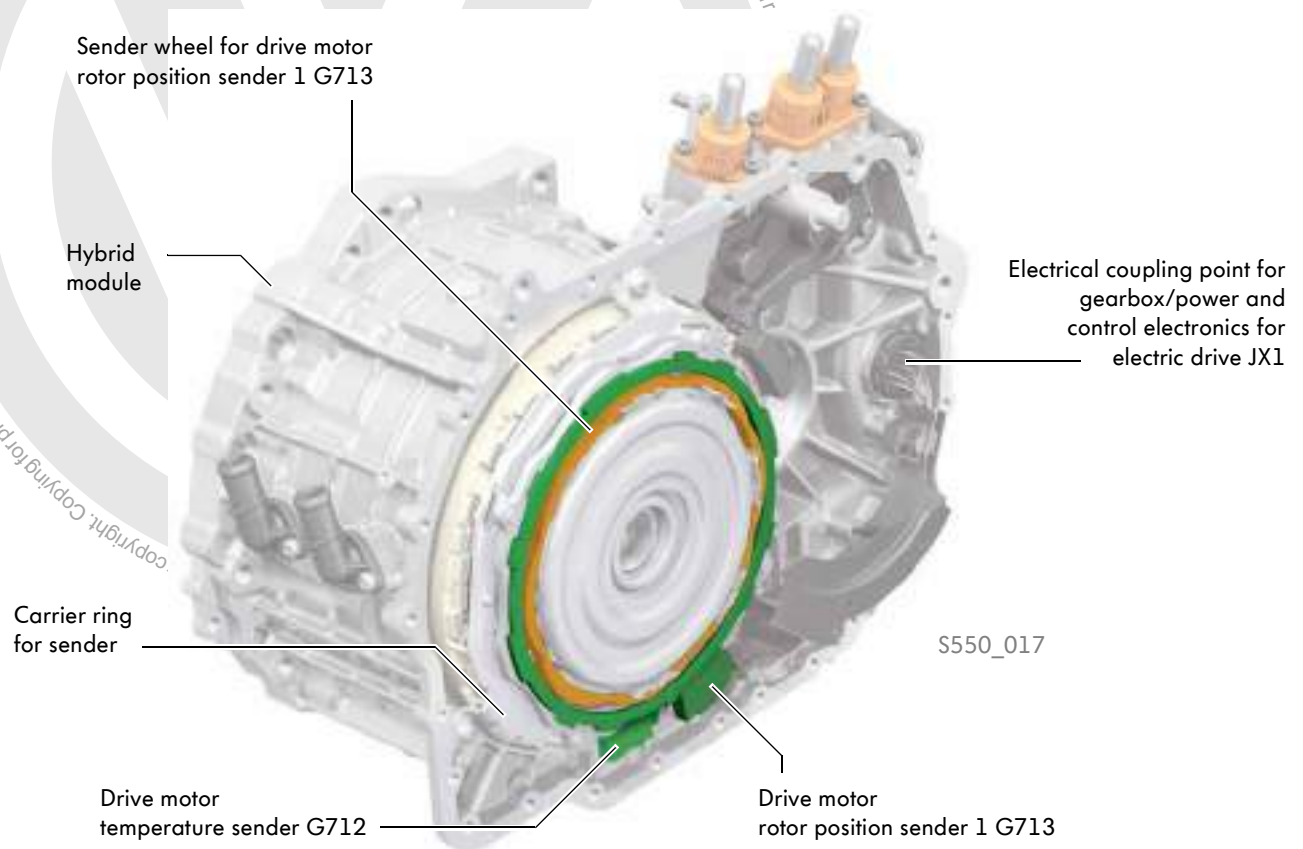
- System output
- System torque



High-voltage system

Drive motor temperature sender G712

This sender measures the temperature of the drive motor. It sends signals to the electric drive control unit J841. The power of the electric drive motor is restricted at temperatures above approximately 150°C. Above 180°C, it is no longer activated to protect it against overheating. The combustion engine is then started to cover the drive requirements. The sender is a NTC thermistor sensor (**N**egative **T**emperature **C**oefficient).



Drive motor rotor position sender 1 G713

This component determines the exact position of the magnets on the rotor in relation to the stator. This allows the magnetic field to be precisely controlled. The sender consists of fixed coils and a sender wheel mounted on the rotor.

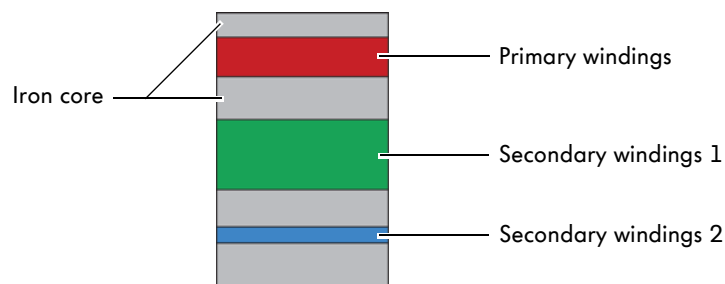
The sender signal is recognised by the electric drive control unit J841 and is used to calculate the position.

Drive motor rotor position sender 1 G713

Design

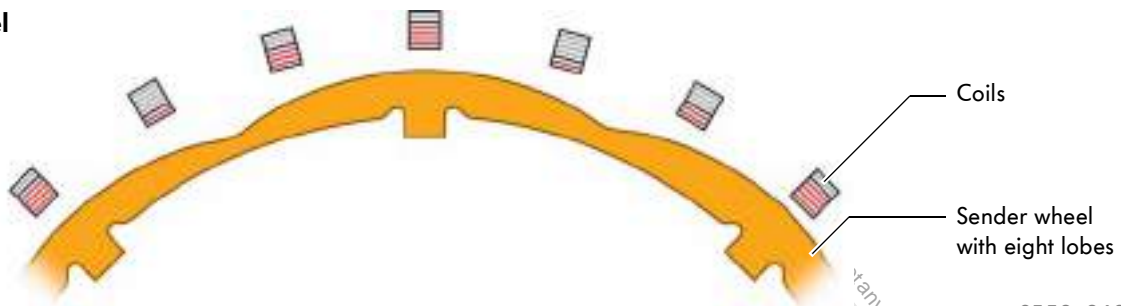
The sender has 30 coils connected in series. Each coil consists of an iron core, one primary winding and two secondary windings. The primary winding is supplied with an excitation voltage by the electric drive control unit J841. The secondary windings have different windings. This allows secondary windings 1 and 2 to be distinguished from one another. The sender wheel has eight lobes that influence the current in the coils by means of induction.

Coil



S550_062

Sender wheel



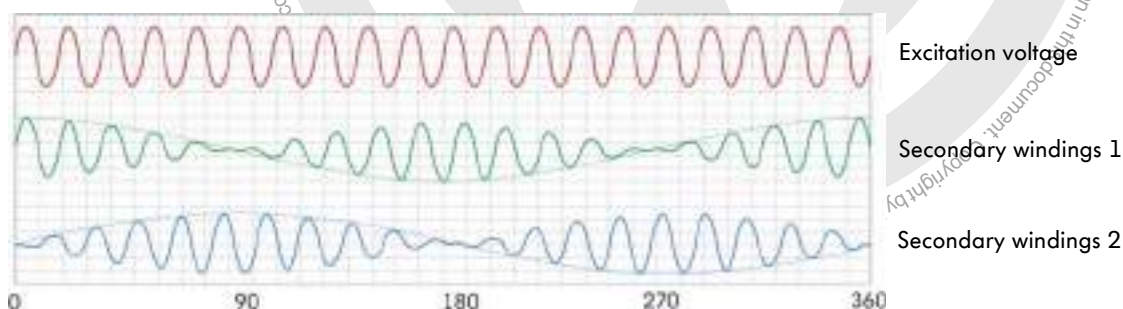
S550_063

Function

When the rotor starts to turn, the sender wheel also turns. The lobes then move from coil to coil and amplify the induction in the secondary windings.

The amplitudes are offset by 90° due the different number of windings for the secondary windings 1 and 2 in each individual coil.

The electric drive control unit J841 calculates the position of the magnets in relation to the coil windings in the electric drive motor V141 based on the amplitudes.



S550_064



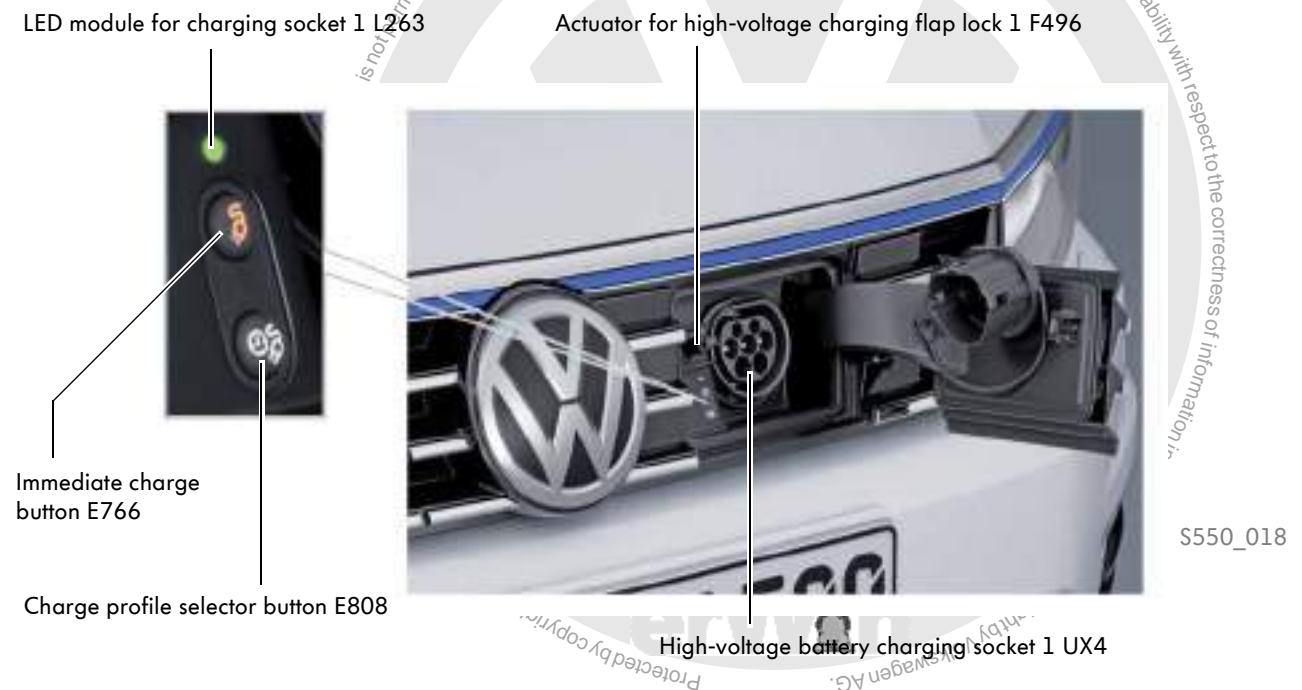
High-voltage system

High-voltage battery charging socket 1 UX4

The charging socket is located in the radiator grille behind a flap. The charging socket for the high-voltage battery 1 UX4 has been placed to the left behind the radiator grille because the sensor for adaptive cruise control is located behind the Volkswagen badge on the Passat 2015. It is locked and unlocked via the central locking system. Once the flap has been unlocked, it can be opened or closed with the “push-push function”. The charging socket is secured to an additional bracket. This bracket is bolted to the lock carrier and the cross member.

The following components are integrated into the charging socket:

- Charge profile selector button E808
- Immediate charge button E766
- LED module for charging socket 1 L263
- Actuator for high-voltage charging flap lock 1 F496



The charging process starts automatically as soon as the vehicle is connected correctly to the electricity mains. Alternatively the system can be programmed so that the charging process is performed at a set time.




Immediate charge button E766

The immediate charge button allows you to start the charging process immediately regardless of whether you have programmed a departure time. The charging process can also be paused or stopped. The charging connector will not be unlocked in this case.







Charge profile selector button E808

If you have programmed a departure time, you can deselect or activate it with the charge profile selector button.

Charging options and charging times

 <p>S550_019</p>	<p>Charging cable with charge regulation</p>	<p>Europe: approx. 4 h 15 min China: approx. 5 h Japan: approx. 10 h</p>
 <p>S550_020</p>	<p>Charging station installed at home</p>	<p>approx. 2 h 30 min</p>
 <p>S550_021</p>	<p>Charging cable for public charging stations</p>	<p>approx. 2 h 30 min</p>

Charging sockets and charging connectors

Europe	Japan	China
Charging socket on vehicle		
 <p>S550_022</p>	 <p>S550_023</p>	 <p>S550_024</p>
Charging connector on vehicle		
 <p>S550_025</p>	 <p>S550_026</p>	 <p>S550_027</p>



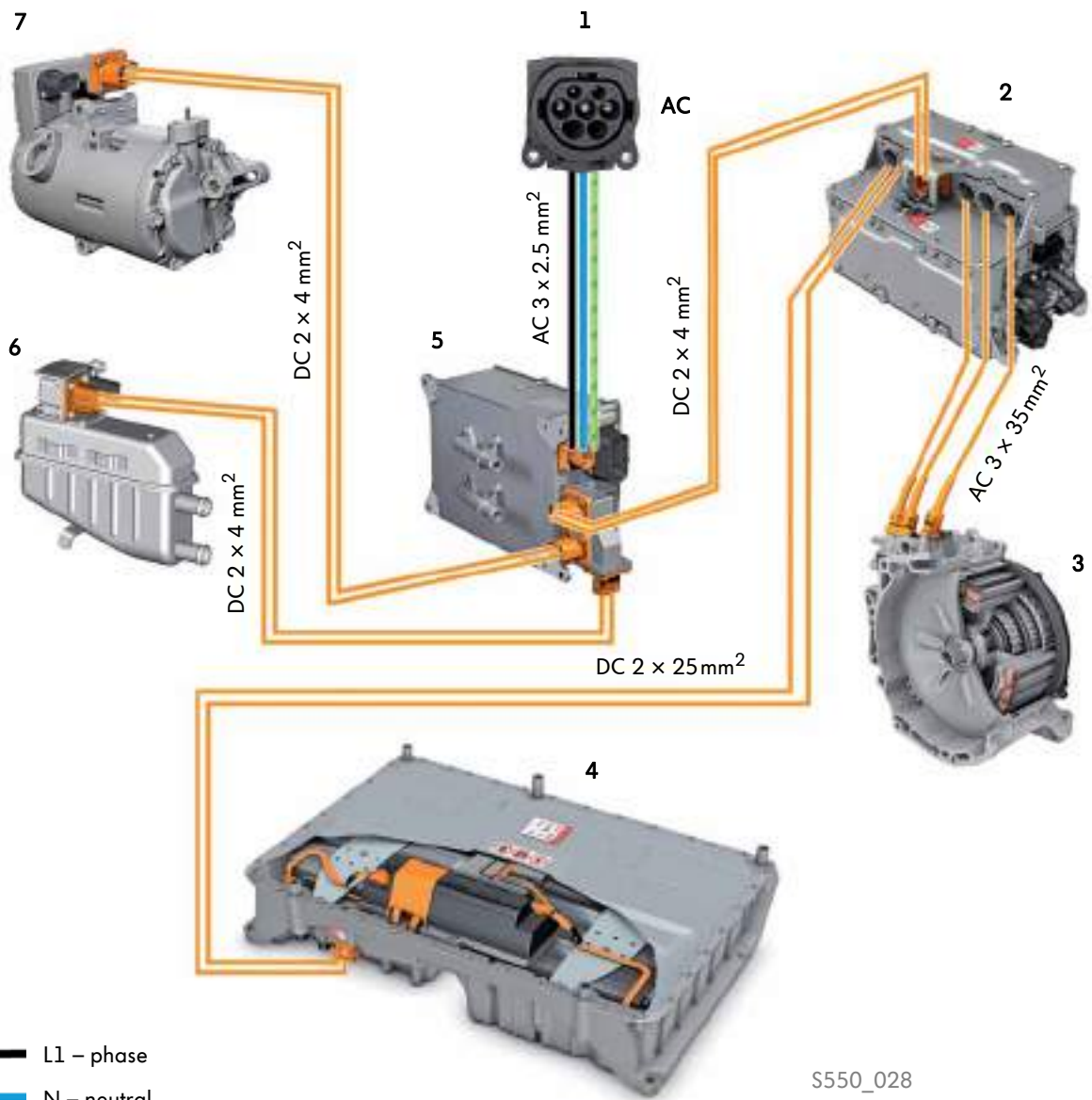
High-voltage system

High-voltage wire routing

The following diagram shows how the high-voltage wires are routed to the high-voltage components and gives the wire cross sections.

- 1 High-voltage battery charging socket 1 UX4
- 2 Power and control electronics for electric drive JX1
- 3 Three-phase current drive VX54

- 4 High-voltage battery 1 AX2
- 5 Charging unit 1 for high-voltage battery AX4
- 6 High-voltage heater (PTC) Z115
- 7 Electrical air conditioner compressor V470



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S550_028

Charging unit 1 for high-voltage battery AX4

The charging unit regulates the charging process for the high-voltage battery. It is controlled by the control unit for high-voltage battery charging unit J1050. An internal power distributor supplies the high-voltage heater Z115 and the electrical air conditioner compressor V470. This allows the air conditioning to also be used during charging operation. The function of the charge voltage control unit for high-voltage battery J966 has been taken over by J1050.

Technical data

AC current input	100–240 V, 16 A
DC current output	220–240 V, 12 A
Efficiency	93%
Weight	5.8 kg



You will find further information in Self-study Programme no. 530 “The e-Golf”.

Engine control unit J623

The engine control unit J623 has been expanded to control the hybrid functions. It decides which drive type should be used to drive the vehicle as efficiently as possible. One further function is the high-voltage coordinator. It monitors all high-voltage components. Once all high-voltage components have been successfully checked, the high-voltage coordinator issues start authorisation. If there are problems, the driver will be informed via the warning lamps in the instrument cluster.

Tasks:

- Operating strategy (combustion engine and electric drive motor)
- Torque distribution
- Control of energy recuperation
- Control of coolant circuit (combustion engine)
- Providing PHEV-specific displays (energy flow displays and power meter)
- Monitoring of high-voltage components (high-voltage coordinator)



S550_029

The high-voltage coordinator is also active in charging mode. If you connect a charging cable, it will monitor all high-voltage components and issue the signal to start charging. If an event occurs, the charging process will be stopped.



High-voltage system

Operating modes

The Passat GTE can be driven in different operating modes.

- E-MODE
 - E-MODE
 - Hybrid
 - Battery Charge
- GTE mode

The vehicle starts primarily in E-MODE. The operating mode is indicated by the LED in the button for electric drive E656 lighting up.

The buttons for selecting the operating modes are located next to the selector lever,



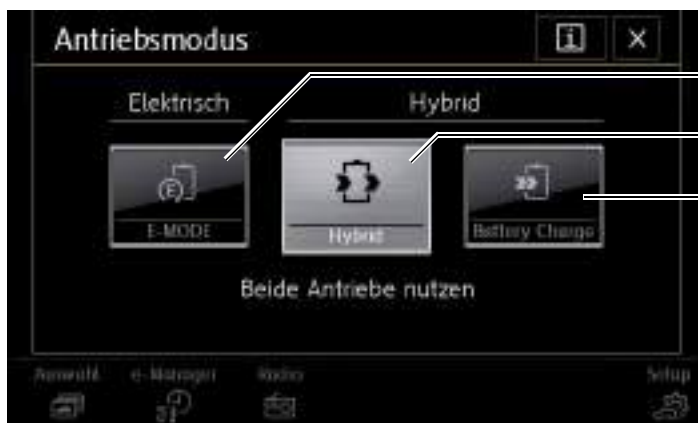
S550_085

Boost function

The boost function is always available in GTE mode. In the other operating modes, it is only available via the kickdown function. The kickdown function deactivates E-MODE. The vehicle then switches to hybrid mode.

E-MODE

If you press the button for electric drive E656, a pop-up window will appear on the infotainment system screen. You can select the drive mode there.



E-MODE

Hybrid

Battery Charge

S550_086

Drive modes

E-MODE: all-electric driving

The vehicle is driven exclusively with electrical energy. E-MODE is deactivated automatically under the following conditions:

- The high-voltage battery is discharged.
- Speed > 130 km/h
- Kickdown or boost function is used
- Outside temperature < -10°C
- Event in high-voltage system

Hybrid: using both drives

The electric motor and the combustion engine work together in an optimum way. This greener driving mode is selected automatically. The charge level of the high-voltage battery at the time of activation is then maintained.

Battery Charge: charging while driving

The high-voltage battery is charged by the combustion engine while you drive. The fuel consumption is then higher.



If the battery charge level is between one and three bars, the vehicle will be not started in E-MODE, but instead in the mode last used. The driver can activate E-MODE manually.

GTE mode

GTE mode combines a drive mode that has been optimised for sporty driving styles with a sports driving profile.

The sporty drive mode has the following characteristics:

- The stored energy is kept above a minimum level. The boost function is thus available at all times (similar to the Battery Charge drive mode).
- The electric boost function is always available.
- The electric drive motor always generates drag torque.



If the vehicle is equipped with the optional “Driver Profile Selection” feature and you select the “Sports” driving profile, the engine and gearbox configuration is not changed. The GTE mode takes on this function.



Mobile online services in the Passat GTE

All Car-Net service groups are offered in the new Passat GTE. The App-connect, e-Remote and Guide & Inform functions are therefore available to the user in one vehicle.

Guide & Inform














The “Charging Stations” service has been added to the familiar Guide & Inform services in the Passat GTE. This service allows you to find and reserve charging stations. In addition, information on the selected charging station is displayed. This includes charging types, availability and payment methods. Up to 13 services are therefore available to users.

Discover Media



Discover Pro



Car-Net function	Guide & Inform Basic	Guide & Inform Plus
 Google StreetView		•
 Google Earth		•
 Parking Info	•	•
 Fuel Info	•	•
 POI Voice Search		•
 Personal POI	•	•
 News	•	•
 Online Traffic Information	•	•
 Destination Import	•	•
 Online POI search	•	•
 Weather	•	•
 Vehicle Health Report	•	•
 Charging Stations	•	•

e-Remote

The Passat GTE has the following e-Remote functions:

- **Air conditioning**
 - Switch the windscreen heating on and off
 - Control the heater and the air conditioning system
 - Adjust the interior temperature
- **Charging**
 - Start and stop the high-voltage battery charging process
 - Adjust the charging current strength
- **Departure time programming**
 - Program three departure times
 - Program charging locations
- **Driving data**
 - Display driving data
 - Driving data depicted with graphics
- **Status**
 - Charging status of high-voltage battery
 - Status until next service event
- **Doors and lights**
 - Display status of doors and lights
 - Display vehicle locking status
- **Parking position**
 - Display parking position
 - Navigation to vehicle

The services are available on the Car-Net customer portal and the Car-Net e-Remote app for Apple and Android smartphones.

Emergency call module control unit and communication unit J949

The emergency call module control unit and communication unit J949 is a data interface with integrated UMTS module. It transmits and receives data and commands for the Car-Net e-Remote services. J949 is constantly connected to the Internet via the mobile communications network. Therefore commands can be received, processed and executed when the ignition is switched off. The data is exchanged with the Volkswagen back-end directly. They are also processed on the back-end. Data is not transferred directly between the customer's device, computer (customer portal) or smartphone (app) and the vehicle. The control unit is located behind the infotainment system screen.



Emergency call module control unit and communication unit J949



Customer portal

Users need to register their vehicles in their customer account on the Car-Net customer portal in order to use Car-Net e-Remote and Guide & Inform.

The Car-Net information page can be found at www.volkswagen-carnet.com. On the site, the user can select the Passat GTE and will be forwarded to the customer portal for the Passat GTE. The following functions are available to users on the portal:

- Create customer account
- Vehicle registration
- Vehicle administration
- Manage personal data
- Use and configure Car-Net services
- Extend contract for Car-Net services

There are two ways to register depending on the equipment:

1. Only Car-Net e-Remote is installed in the vehicle. Users need to register their vehicle with the vehicle identification number (VIN) and the current mileage (km) in their customer account.

Step 1:

The customer selects the vehicle type at www.volkswagen-carnet.com. The customer then registers to create a customer account.



Step 2:

The customer enters the vehicle identification number (VIN) in the input screen.



Step 3:

The customer enters the current mileage (km) in the input screen for the customer account.



Step 4:

The customer needs to install the e-Remote app on the smartphone and register the smartphone in the customer account.



S550_092

2. Only Guide & Inform or e-Remote and Guide & Inform are installed in the vehicle.

Step 1:

The customer selects the vehicle type at www.volkswagen-carnet.com. The customer then registers to create a customer account.



Step 2:

The customer enters their vehicle identification number (VIN) and confirms the GTCs and provisions for data protection.



Step 5:

If e-Remote is installed in the vehicle, the customer will need to install the e-Remote app on their smartphone and register the smartphone on their customer account.



Step 3:

The customer receives an 8-digit registration code.



Step 4:

The customer connects the vehicle to the internet and enters the registration code in the radio navigation system.



App Connect

App Connect provides customers with three interfaces for connecting a smartphone to the infotainment system:

- Android Auto
- Apple CarPlay
- MirrorLink

This connection method allows the screen content on the smartphone to be shown on the infotainment system screen.



S550_093

S550_087

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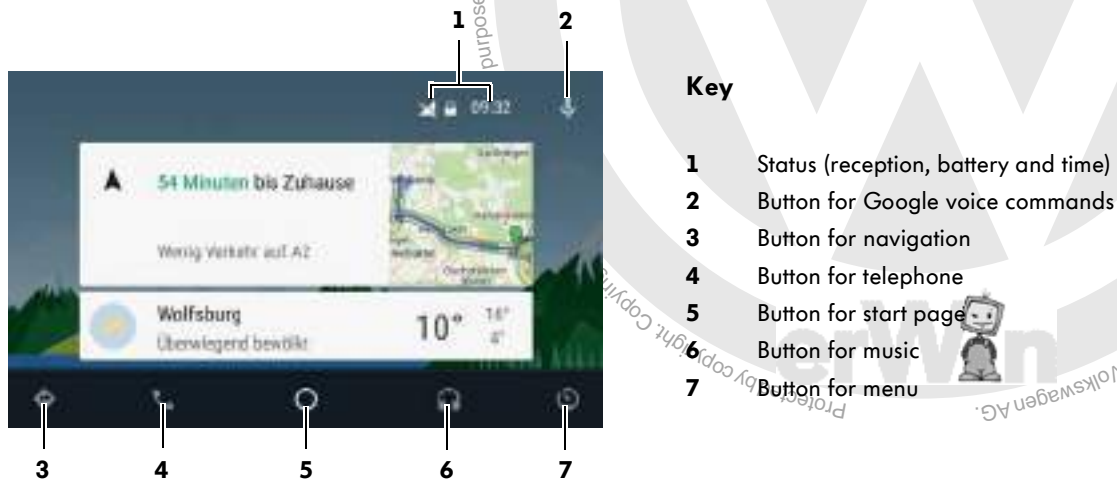
Android Auto

Android Auto is a service that is developed and managed by Google. Android Auto allows you to connect a smartphone to the infotainment system. You can then control the smartphone via the vehicle touchscreen. The interactive “Google Now” user interface is displayed on the infotainment system with Android Auto. Various information is displayed on the start screen. The information displayed depends on your smartphone configuration and whether location sharing has been enabled. The following information can be displayed:

- Weather
- Navigation
- Missed calls
- Text messages
- E-mails
- Music currently playing

When an Android Auto connection is active, the smartphone is in standby mode and can only be operated via the infotainment system. The vehicle needs to be stationary when you connect the smartphone for the first time as you will need to confirm system messages. In addition to the cable connection, a Bluetooth connection for the hands-free function is automatically set up.

Design of Android Auto display



S550_088

Requirements

- Smartphone with Android operating system version 5.0 or higher.
- The smartphone has been connected to the vehicle via a USB data cable.
- The vehicle needs to be stationary when you connect the smartphone for the first time.
- The smartphone and apps have been approved by Google and comply with their country restrictions.

Apple CarPlay

Apple CarPlay is a service provided by Apple that allows you to connect an iPhone to the infotainment system. Once connected, the iPhone can be operated via the infotainment system touchscreen. You can still use the iPhone while it is connected. Apps that are started via the infotainment system are also visible on the smartphone.

An iPhone USB data cable is used for the connection. Apple CarPlay will start automatically if the “Siri” voice-recognition software is activated in the iPhone preferences. Existing Bluetooth connections between the iPhone and vehicle are automatically disconnected. All of the data and the speech for the hands-free function are transferred via the data cable.

Design of the Apple CarPlay display



Requirements

- iPhone 5 or above
- iOS operating system version 8.0 or above
- The smartphone and apps have been approved by Apple and comply with their country restrictions.
- “Siri” needs to be activated



MirrorLink

MirrorLink is a cross-operating system standard. It enables smartphone content to be displayed on the infotainment system screen. MirrorLink was developed by the “Car Connectivity Consortium” (CCC). The consortium is made up of several vehicle, smartphone and infotainment system manufacturers. Only smartphones with the Android operating system currently support MirrorLink. This standard allows apps to be shown on the infotainment system display also while you are driving. The requirement for this is approval of the respective app by the CCC.

The smartphone and vehicle are connected via a USB data cable. Only image and music data are transferred via the data cable. You also need to pair the smartphone via Bluetooth in order to use the hands-free function in the vehicle. The smartphone needs to be connected to the Internet for MirrorLink to work correctly. Only then can the app certificates be downloaded that allow the system to also display the apps whilst driving.

Design of MirrorLink display



Key

- 1 Disconnect the MirrorLink connection
- 2 Close active apps
- 3 Activate mirroring
- 4 Display area of all MirrorLink-compatible apps that are installed on the smartphone
- 5 Setup menu for infotainment system

Requirements

- MirrorLink-capable smartphone (currently only available for the Android operating system)
- The smartphone has been connected to the vehicle via a USB data cable.
- The apps have been approved by the “Car Connectivity Consortium”

Charging stations

The “Charging Stations” service can be opened via the Guide & Inform menu or is listed as an option when you touch the “POI” button.



S550_105

When you activate the service, charging stations in the vicinity of the vehicle will be displayed. You can select a charging station by touching a search result.



S550_106

The address data for the charging station is displayed. You can start navigation directly from this menu or save the charging station in the memory as a POI.



S550_107

Touch the “Further Information” button to access detailed information on the selected charging station. This includes:

- Number of charging connectors
- Type of charging connectors
- Availability of corresponding charging station
- Price and payment information
- Access information
- Information on charging station



S550_108



Electrical system

Fitting locations in the 12-volt vehicle electrical system

The 12-volt vehicle battery is located in the luggage compartment in the Passat GTE. It has the task of supplying the convenience components when terminal 15 is off.

The power and control electronics for electric drive JX1 are located in the engine compartment. In addition to controlling the three-phase current drive VX54, it controls the charging of the 12-volt vehicle battery and the supply to the convenience components when terminal 15 is on.

A jump starting point (positive terminal of the 12-volt vehicle battery) is located in the electronics box in the engine compartment.

Power and control electronics for electric drive JX1



Electronics box with relay and fuse holder SB and multifuse pre-fuse holder SA



Jump starting point, positive battery terminal



ed unless autho.

receptor an



12-volt vehicle battery



Fuse (200 A) on positive terminal of 12-volt vehicle battery



Relay and fuse holder SC at the bottom left of the passenger compartment, behind the storage compartment



Labelling of emergency cut-out connection in the interior

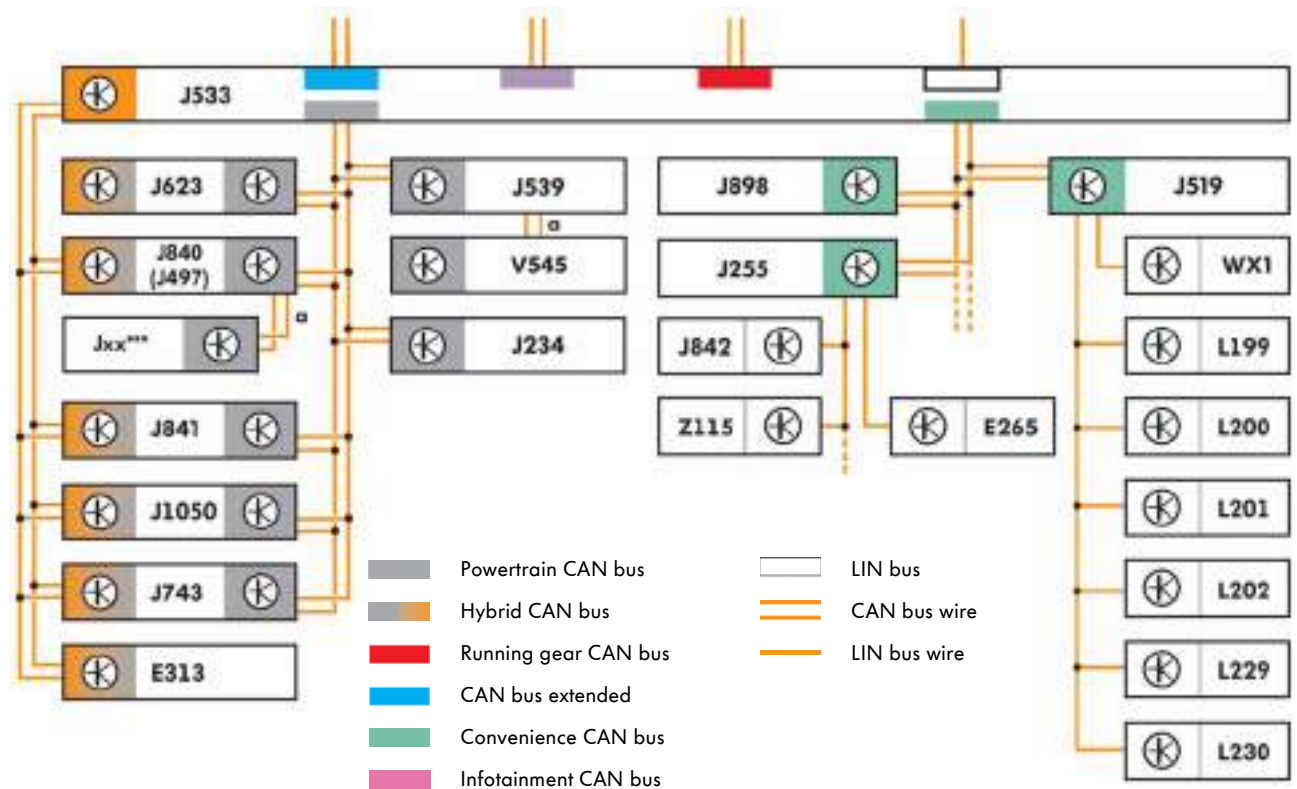


S550_036

Electrical system

Networking concept

The networking concept is based on the modular transverse matrix.



S550_044

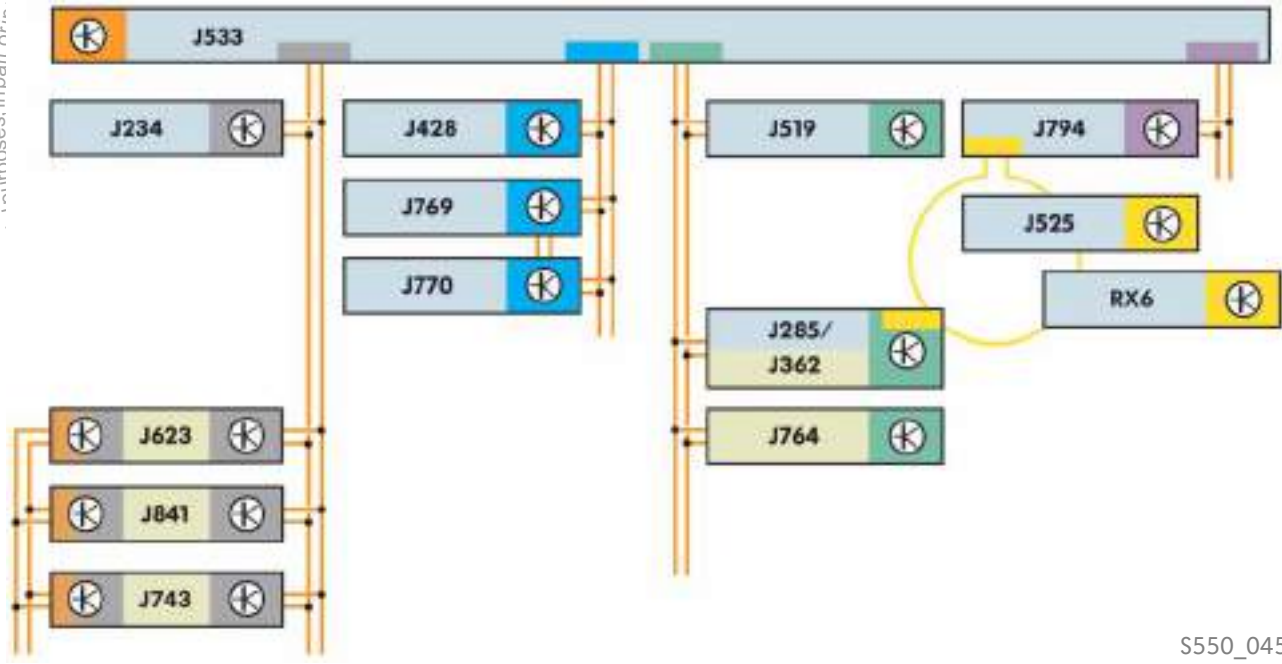
Key

a	Private CAN bus	J841	Electric drive control unit
E265	Operating and display unit for rear air conditioning system	J842	Control unit for air conditioning compressor
E313	Selector lever	J898	Control unit for Head-up Display
J234	Airbag control unit	J1050	Control unit for high-voltage battery charging unit
J255	Climatronic control unit	Jxx***	Battery modules 0–26: J991–J1002; J1068; J1077–J1085
J840	Battery regulation control unit	L199–	Lights for door background lighting
J497	Module monitor control unit for batteries	L202	
J519	Onboard supply control unit	L229–	Lights for dashboard ambient lighting
J533	Data bus diagnostic interface	L230	
J539	Brake servo control unit	V545	Motor in brake pressure accumulator for energy recovery
J623	Engine control unit	WX1	Front interior light
J743	Mechatronic unit for dual clutch gearbox	Z115	High-voltage heater (PTC)
J840	Battery regulation control unit		



The diagram only shows the differences from the Passat 2015. You will find further information in Self-study Programme no. 545 “The Passat 2015 – Electrical System”.

Immobiliser and component protection



S550_045

Key

- | | | | |
|------|--|----------------|---|
| J234 | Airbag control unit | Light blue box | Participates in immobiliser system |
| J285 | Control unit in dash panel insert | Light blue box | Participates in component protection system |
| J362 | Immobiliser control unit | Grey box | Powertrain CAN bus |
| J428 | Adaptive cruise control unit | Orange box | Hybrid CAN bus |
| J519 | Onboard supply control unit | Blue box | CAN bus extended |
| J525 | Digital sound package control unit | Green box | Convenience CAN bus |
| J533 | Data bus diagnostic interface | Purple box | Infotainment CAN bus |
| J623 | Engine control unit | Yellow box | MOST bus |
| J743 | Mechatronic unit for dual clutch gearbox | Orange line | CAN bus wire |
| J764 | Control unit for electronic steering column lock | Yellow line | MOST fibre optic cable |
| J769 | Lane change assist control unit | | |
| J770 | Lane change assist control unit 2 | | |
| J794 | Control unit 1 for information electronics | | |
| J841 | Electric drive control unit | | |
| RX6 | TV tuner | | |



You will find further information on the immobiliser and component protection in Self-study Programmes no. 517 “The Golf 2013 – Electrical System” and no. 545 “The Passat 2015 – Electrical System”.

Electrical system

Front lights

Daytime running lights

The daytime running lights module has a C-shaped design and has been installed in the front bumper. The module has four LEDs that are connected in series. The control unit has been integrated into the module for the daytime running lights. The four LEDs are activated using a 100% PWM signal. When terminal 58 (side light) is switched on, the signal is dimmed to 10%.



Daytime running light 4 LEDs (3 W each)

S550_033

Ambient lighting with RGB LED

The ambient lighting using RGB LEDs can be ordered as an option for the Passat GTE and all Passat models. It features six RGB LEDs that can light up the trim strips inside the vehicle in three different colours.

RGB LED

An RGB LED consists of a multi-chip LED module that contains three LEDs. Each LED has a different colour – red, green and blue – hence the abbreviation RGB. Different timings and colour blending can be used to create almost any combination colour that can be formed from these three colours. The following colours can be set:

- White
- Blue
- Orange

The lighting shown in the picture uses RGB LEDs:

Light for left dashboard ambient lighting L229

Light for right dashboard ambient lighting L230



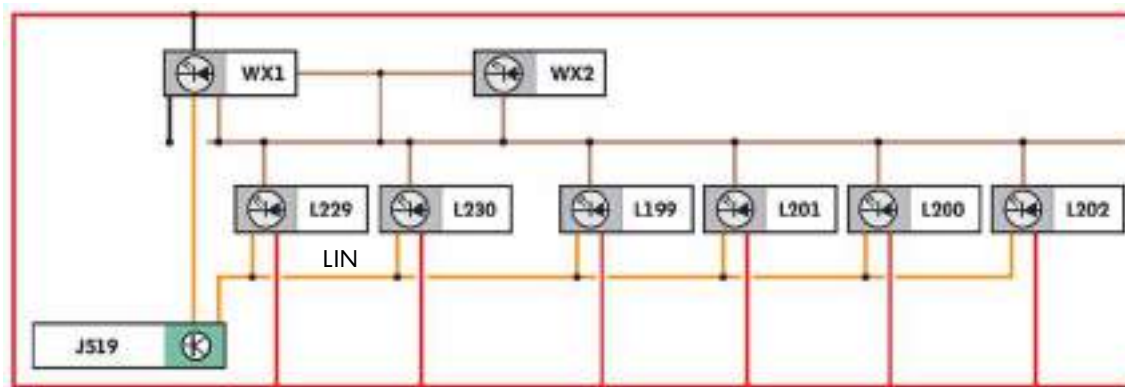
Light 1 for front left door background lighting L199

Light 1 for front right door background lighting L200

S550_057





Circuit diagram for ambient lighting with RGB LEDs

This function is controlled by the onboard supply control unit J519. The RGB LEDs are activated via a LIN bus.



S550_056

Key

J519	Onboard supply control unit		Terminal 30a, positive wire
L199	Light 1 for front left door background lighting		Terminal 31, earth
L200	Light 1 for front right door background lighting		Terminal 58d, adjustable instrument lighting
L201	Light 1 for rear left door background lighting		LIN bus wire
L202	Light 1 for rear right door background lighting		
L229	Light for left dashboard ambient lighting		
L230	Light for right dashboard ambient lighting		
WX1	Front interior light		
WX2	Rear interior light		



Electrical system

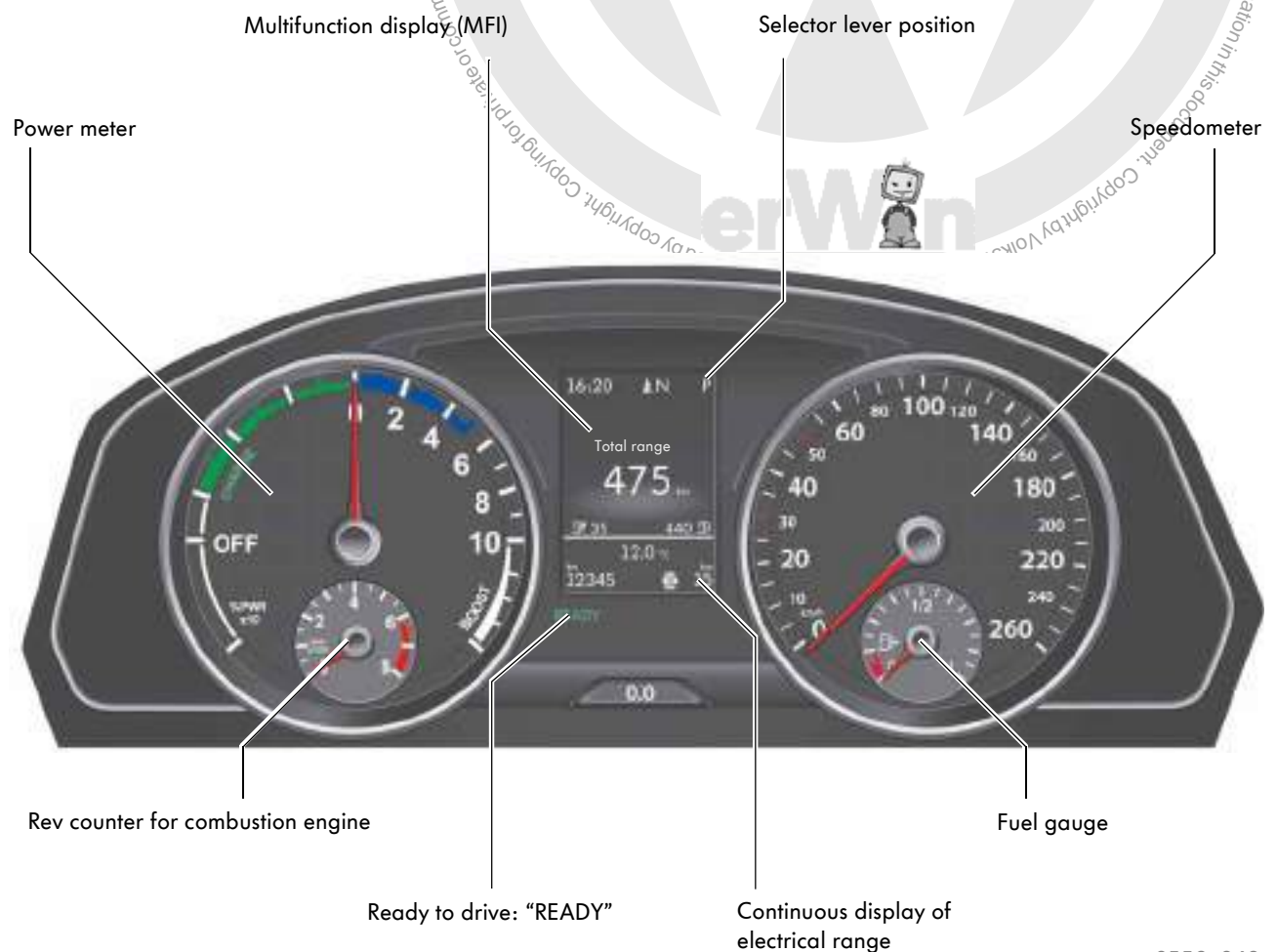
Instrument cluster

The following instrument clusters are available for the Passat GTE:

- “Colour”
- “Active Info Display (AID)”

“Colour” instrument cluster

The software and hardware for the “Colour” instrument cluster has been adapted for use in hybrid vehicles. The illustration below shows the displays.



S550_043

Left-hand instrument dial

The left-hand instrument dial consists of:

- Power meter with boost range
- Reserve warning for high-voltage battery (8)
- Rev counter for combustion engine (7)

The power meter is divided into the following areas:

- Inactive state (1)
- OFF “not ready to drive” (2)
- Recuperation (3)
- Ready to drive (4)
- Economic driving (5)
- Power delivered and boost range (6)



In the boost range, the combustion engine and the electric drive motor run together.

S550_100

Multifunction display

The multifunction display in the instrument cluster features a colour TFT display with a resolution of 320 x 240 pixels.

In addition to displaying various driving information, there are the following electric drive displays:

- Total range, electrical range and range of combustion engine
- Operating modes including the charge level of the high-voltage battery
- Available power
- Consumption indicator (electrical consumption and fuel consumption)



S550_101



Power availability gauge

When the vehicle is driven in Hybrid Auto mode, the energy flow and the charge level of the high-voltage battery are shown in the multifunction display. If E-MODE is activated, the power available from the electric drive is also shown. The available power is indicated by a grey progress bar between 0 and E-Max. The longer the progress bar is the more power is available to the electric drive. There is a blue bar within the grey progress bar. It shows how much power is currently being used by the electric drive. The available power depends on the temperature and the charge level of the high-voltage battery.



S550_102

Consumption indicator

Current consumption

The electrical consumption is displayed in addition to the current fuel consumption. It is displayed in kWh/km when the ignition is switched on. The electrical consumption is displayed in kWh/100 km at speeds above 5 km/h. A negative consumption figure is shown during charging by recuperation or by the combustion engine. In hybrid operation, the high-voltage battery is charged or discharged depending on the current operating mode.



S550_103

Average consumption

Like the current consumption, the average electrical consumption is also displayed in kWh/100 km. In contrast to the current consumption display, the average fuel consumption display cannot show negative values.



S550_104

Active Info Display (AID)

All vehicle information is displayed virtually on a 12" TFT screen, The left-hand instrument dial in the AID dash panel insert changes according to the driving mode: E-MODE, Hybrid Auto and GTE mode.



S550_039



You will find further information about the Active Info Display in Self-study Programme no. 545 "The Passat 2015 – Electrical System".

E-MODE

Only the power meter is displayed in the left-hand instrument dial. The rev counter is not displayed in this case.



S550_038

Hybrid Auto

In the left-hand instrument dial, a virtual needle functions as the rev counter for the combustion engine and the blue bar indicates the power being used.



S550_039



Electrical system

GTE mode

Only the rev counter is displayed in the left-hand instrument dial.



S550_040

Electric drive displays

In contrast to the “Colour” instrument cluster, the Active Info Display can also show the “Energy Flow” and “Zero Emission” electric drive displays. Both displays can only be shown on the infotainment system screen when the vehicle is equipped with the “Colour” instrument cluster.

You will find further information on the above-mentioned displays on page 65.



S550_041

Head-up display

The head-up display is a projection system that projects a virtual image with current driving information into the driver’s extended field of vision. Data from the driver assist systems and the navigation system are displayed. Since the virtual image is positioned above the bonnet, drivers can read the displayed information without taking their eyes off the road.

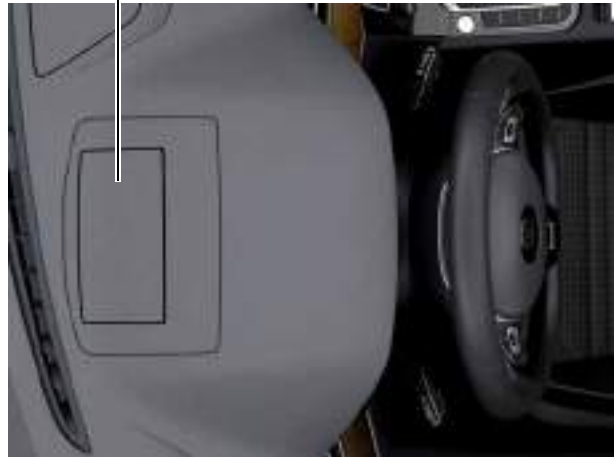


S550_034

Design

The head-up display is located in the dash panel between the windscreen and the dash panel insert. The system basically consists of two components: a flap in the dash panel and a head-up display module. When you activate the system, the flap in the dash panel is opened by a control motor allowing the head-up display to be raised. When the system is not required, the flap is closed flush with the dash panel.

Flap in dash panel for head-up display



S550_070

Open and close display motor V301

Flap in dash panel for head-up display



Head-up display module



S550_081

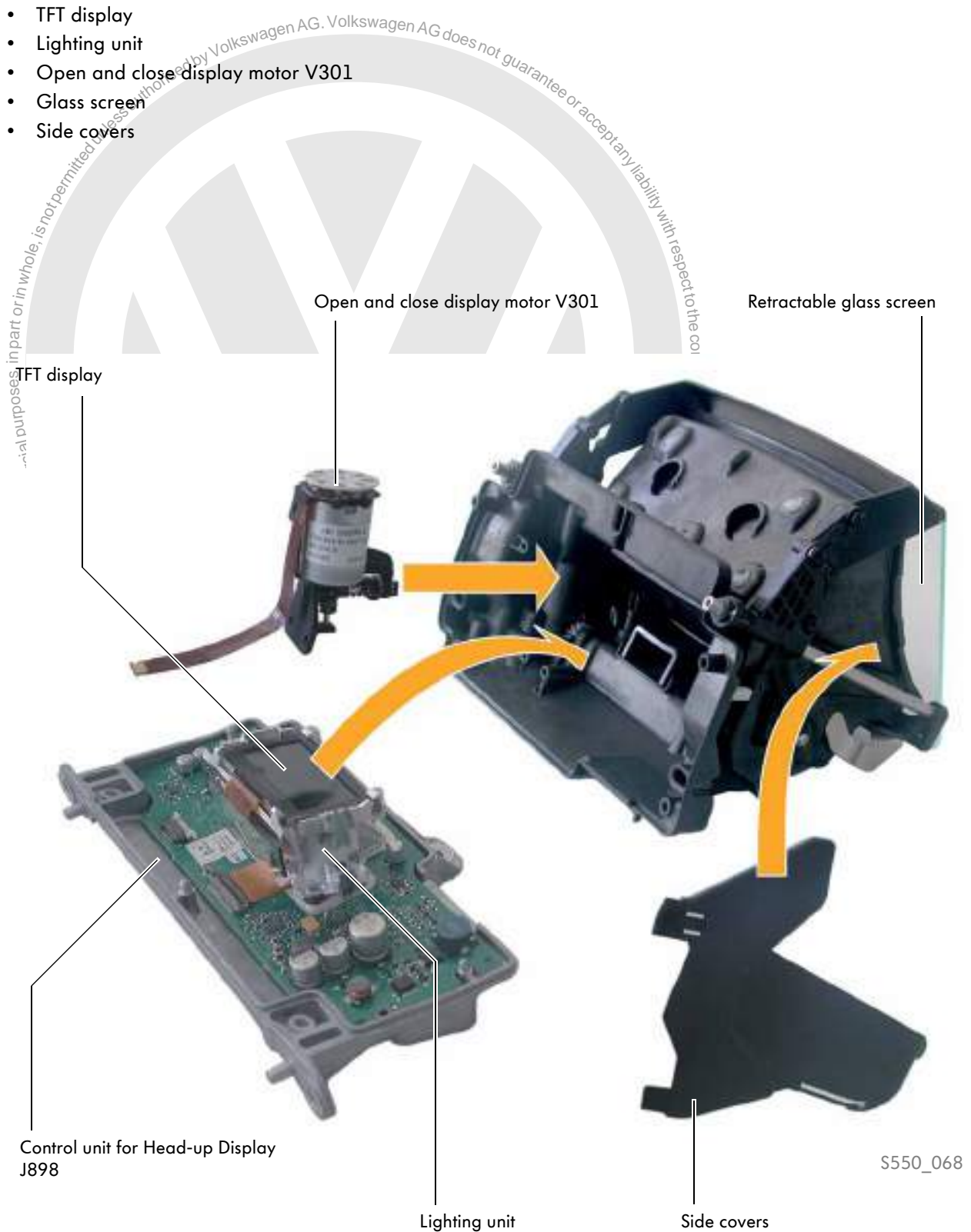


Electrical system

Head-up display module

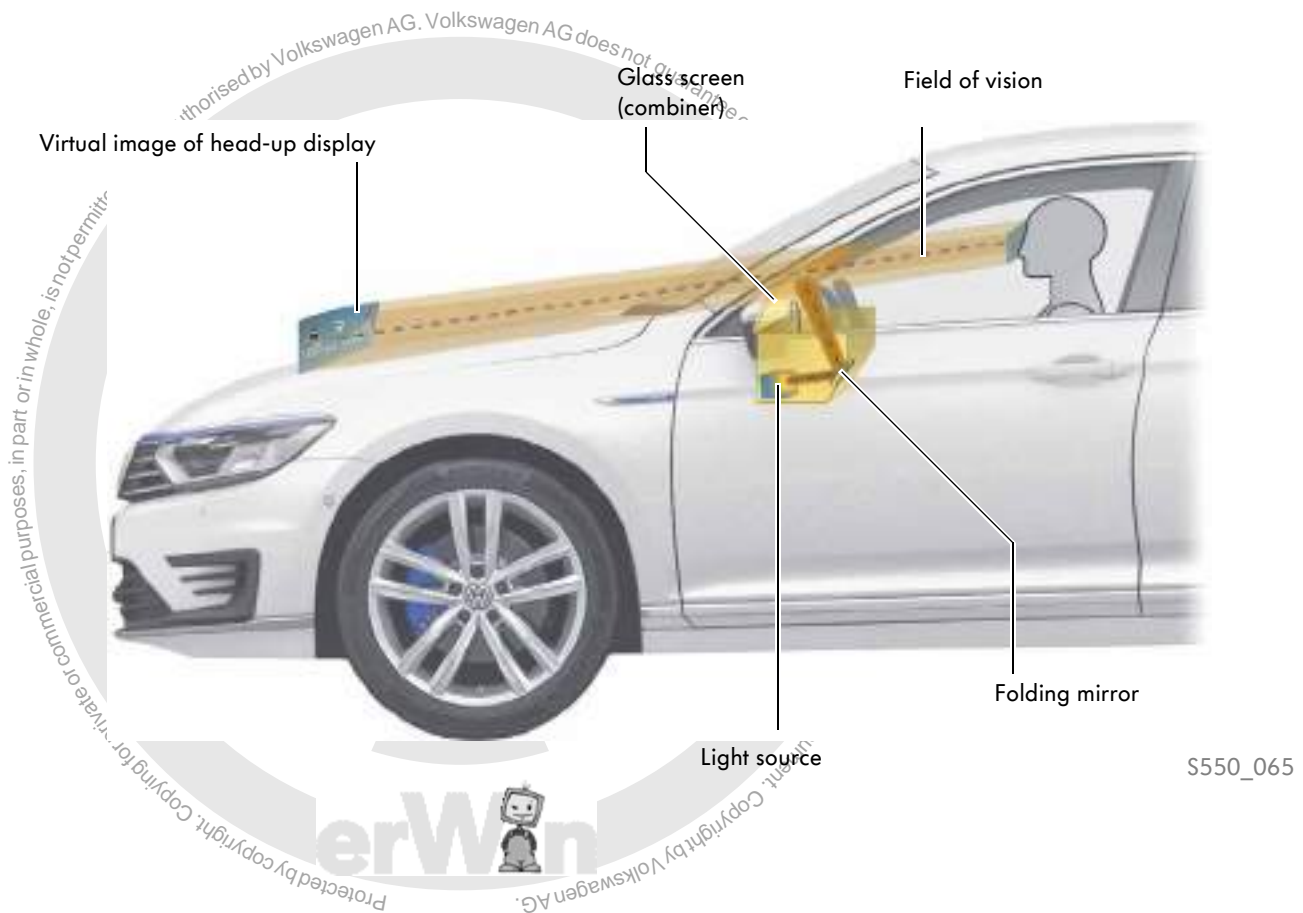
The head-up display module consists of the following components:

- Control unit for Head-up Display J898
- TFT display
- Lighting unit
- Open and close display motor V301
- Glass screen
- Side covers



Function

The head-up display is created by a lighting unit shining through a TFT display from behind. The lighting unit is made up of various LEDs. The light beams are projected onto a specially shaped glass screen via an internal folding mirror. The glass screen is raised by a control motor and is used to adjust the display height. Thanks to the internal folding mirror combined with the glass screen, you are given the impression that the head-up display does not appear in the area of the glass screen, but at a pleasant distance of two to two and a half metres in front (virtual image).



The brightness of the display is constantly adjusted to the ambient light. The control unit J898 evaluates the values from the rain and light sensor G397 to establish the ambient brightness and activates the lighting unit accordingly. The brightness is configured so that the display is still easy to read in direct sunlight.



Electrical system

Switch for head-up display E736



Switch for head-up display E736

The switch for Head-up Display E736 is used for the following functions:

- Switching the head-up display on and off by pressing the switch.
- Adjusting the vertical position of the glass screen by turning the switch. This feature allows you to adjust the glass screen in the head-up display to your seat position or body height.

Head-up displays

The following information can be shown on the head-up display:

- Displays for driver assist systems like ACC, traffic sign recognition, CCS and lane change assist.
- Navigation system displays
- Digital speed display
- Warning messages

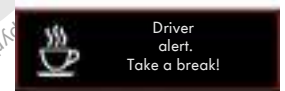
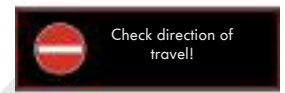


Speed

Navigation

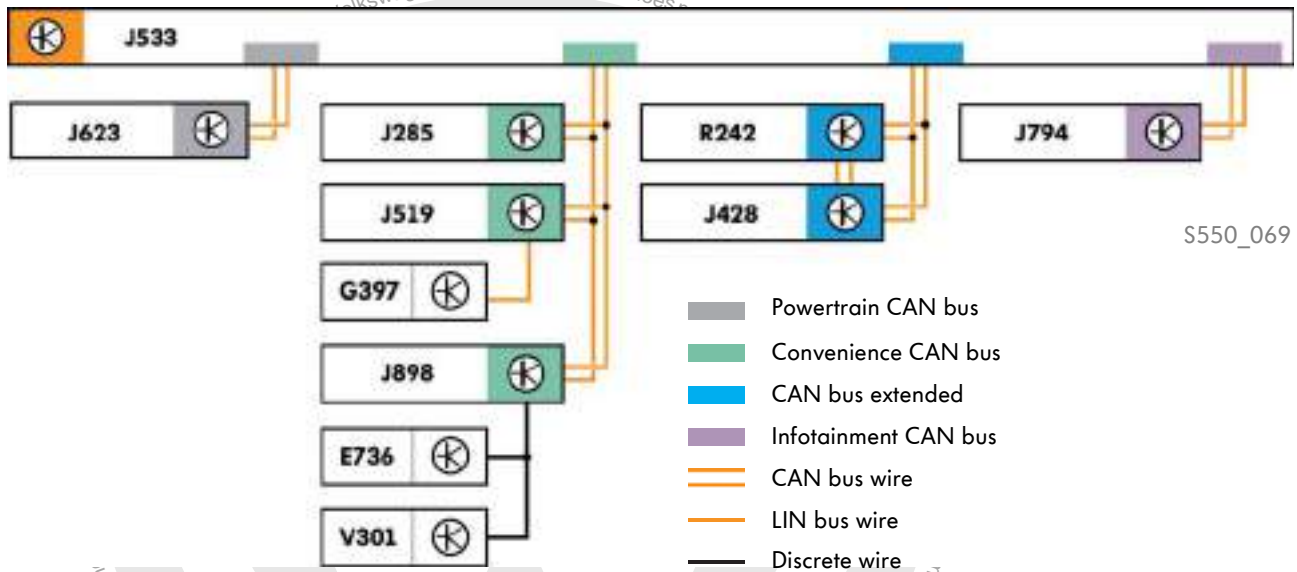
Driver assist systems

Warning messages



S550_075

Circuits and networking



S550_069

Key

E736	Button for head-up display	J623	Engine control unit
G397	Rain and light sensor	J794	Control unit 1 for information electronics
J285	Control unit for dash panel insert	J898	Control unit for Head-up Display
J428	Adaptive cruise control unit	R242	Front camera for driver assist systems
J519	Onboard supply control unit	V301	Open and close display motor
J533	Data bus diagnostic interface		

The control unit J898 receives information from the following control units for the head-up display:

Control unit in dash panel insert J285

- Current vehicle speed
- Warning messages

Control unit 1 for information electronics J794

- Direction arrow when navigation is active
- Bar indicator or distance figure when navigation is active
- Setting in infotainment system for content of head-up display
- Setting in infotainment system for brightness of display

Engine control unit J623

- Current control speed of cruise control system

Adaptive cruise control unit J428

- Status of ACC cruise control (combined display with lane change assist)
- Set regulating distance for the ACC

The control unit J898 receives further information and requests from the following control units:

Onboard supply control unit J519

- Current values for the ambient brightness from the rain and light sensor G397

Data bus diagnostic interface J533

- Switch off the head-up display when the battery voltage is too low or transport mode is activated.



Infotainment system

The Passat GTE features infotainment systems from the second generation of the modular infotainment matrix (MIB). The following variants are available: Composition Media, Discover Media and Discover Pro.

These infotainment systems have been modified for use in hybrid vehicles and have the following electric drive displays and functions:

- Electric range monitor
- Energy flow display
- Zero emission display
- Navigation: 360° range (only “Discover Media” and “Discover Pro”)
- Driving profile selection
- e-manager



You will find further information on the MIB second generation in Self-study Programme no. 546 “The Passat 2015 – Infotainment and Car-Net”.



The sound system can be ordered as an option for each infotainment system. The subwoofer R211 is not available in the Passat GTE.

Electric range monitor

The electric range monitor shows the current electric vehicle range in a diagram. Furthermore you are informed about the potential range that could be added if you switch off convenience functions. This function is activated by the data bus diagnostic interface J533.



S550_094

Energy flow display

The energy flow display uses an animated diagram to depict the flow of energy between the electric motor and the high-voltage battery when the vehicle is accelerating or during braking and recuperation. The power consumption is indicated by blue arrows. Blue arrows in the opposite direction indicate that the high-voltage battery is being charged by braking or recuperation.

The energy related to the combustion engine is indicated by orange arrows. The high-voltage battery shown indicates the charge level. GTE mode is shown with orange/blue arrows.



S550_095

Zero emission display

The “zero emission” statistics indicate the emission-free proportion of the route driven and thus provide motivation to drive in an environmentally-friendly manner. “Zero emission” represents the distance travelled without using the combustion engine.



S550_096

Navigation: 360° range

The vehicle’s electric range is shown by the 360° range view. The inner area shows the range for a journey to and from the configured home address. The outer area shows the range for a single journey. Known charging stations can be displayed and added to the route.



S550_097



Heating and air conditioning

Air conditioning

The Passat GTE uses various air conditioning components from the modular transverse matrix:

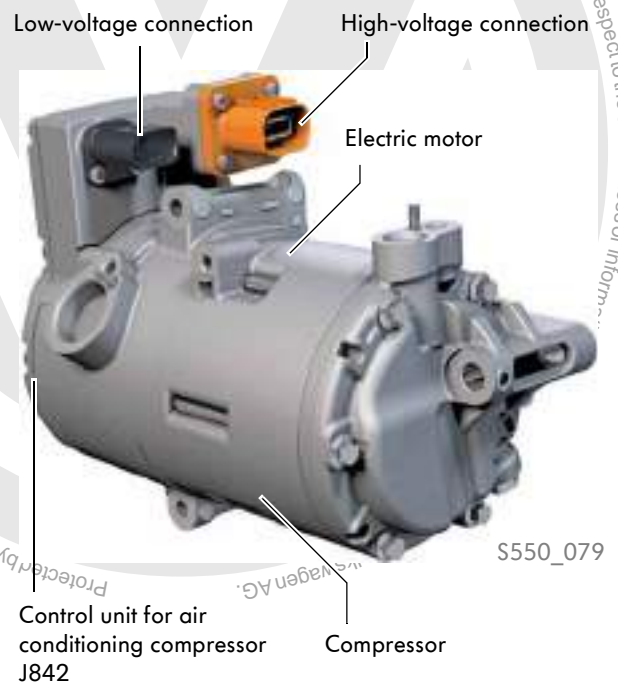
- Electrical air conditioner compressor V470
- Stationary air conditioning using high-voltage heater Z115
- Cooling of the high-voltage battery
- 3-zone Climatronic from the Passat 2015

The system is summarised again in the following section.

Electrical air conditioner compressor

Technical data

Type	Scroll compressor
Nominal voltage	374 V
Rotational speed	800–8,600 rpm
Power consumption	3.6 kW
Operating temperature	-10°C–120°C
Weight	6 kg
Refrigerant	R134a
Refrigerant oil	SP-A2
Communication	LIN bus



The Passat GTE comes with a 3-zone Climatronic air conditioning system as standard. The electrical air conditioner compressor is powered by the high-voltage battery. If work is performed on the air conditioner compressor, the high-voltage system must be de-energised by a high-voltage technician beforehand. A qualification certificate is required for work on the refrigerant circuit for the air conditioning system.



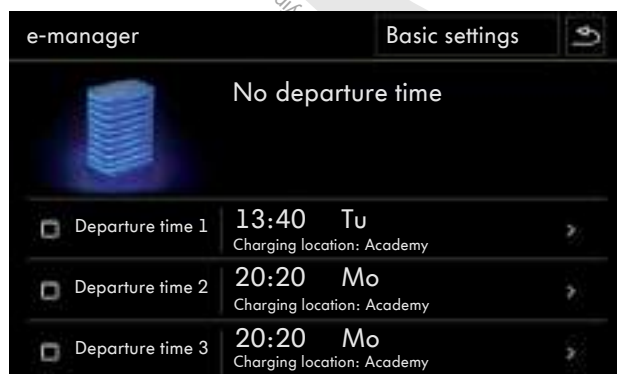
You will find further information in Self-study Programme no. 525 “The Jetta Hybrid”.

Stationary air conditioning

The stationary air conditioning system has the following functions:

- Cooling with electrical air conditioner compressor V470
- Heating with high-voltage heater (PTC) Z115
- Heating and auxiliary ventilation using the optional "Thermo Top Evo" auxiliary heater

The cooling and heating functions using the high-voltage components are activated with a timer or the Car-Net e-Remote app. A second menu provides an option for programming the optional "Thermo Top Evo" auxiliary heater.



S550_080

The optional "Thermo Top Evo" heater unit from WEBASTO is used as an auxiliary heater. The auxiliary heater can only be used when the vehicle is stationary (with ignition off). If you switch on the ignition while the heater unit is running, it will be switched off immediately and continued circulation begins in the auxiliary heater circuit. The indicator LED on the air conditioning operating unit goes out and any remaining run time is cancelled. A supplementary heater function is not available.

Diagnosis

The heater unit needs to be set to diagnosis mode before diagnosis can be performed with the ODIS vehicle diagnostic tester. The auxiliary heater can be accessed via address word 18.



Heating and air conditioning

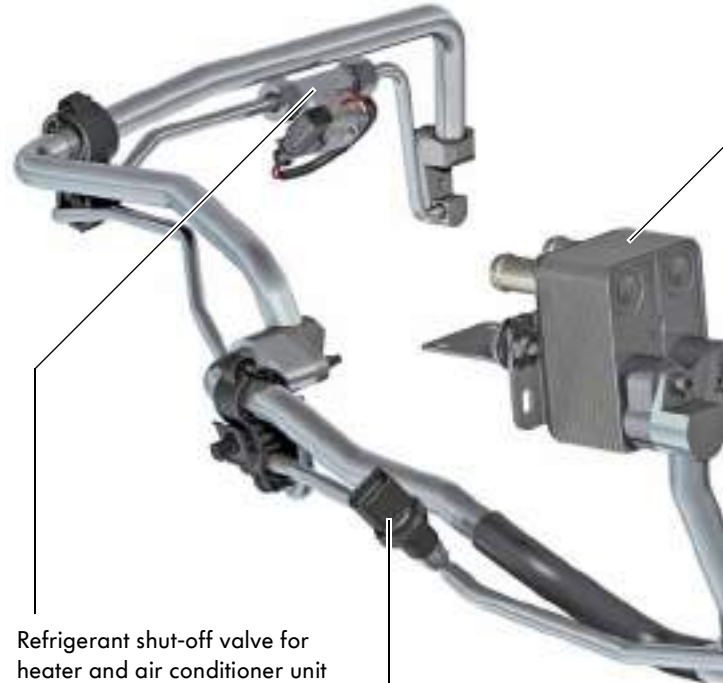
Refrigerant circuit for high-voltage battery

A second refrigerant circuit is used in parallel to the existing refrigerant circuit in the Passat GTE. It has the task of cooling the high-voltage battery. The second refrigerant circuit consists of the following components:

- Heat exchanger for high-voltage battery VX63
- Refrigerant shut-off valve for heater and air conditioner unit N541
- Refrigerant shut-off valve for high-voltage battery heat exchanger N542
- Pressure sender for refrigerant circuit G805
- Restrictor with a bore of 0.7 mm
- Refrigerant lines

The high-voltage battery heat exchanger has the task of cooling the coolant in the cooling circuit for the high-voltage battery, as required. Shut-off valve N542 is opened for this purpose. The open request is transmitted by the battery regulation control unit and is forwarded via the CAN bus to the Climatronic control unit J255.

The shut-off valve N541 is used to switch off the air conditioning in the interior. Both shut-off valves are actuated by the Climatronic control unit J255 and are open when de-energised.

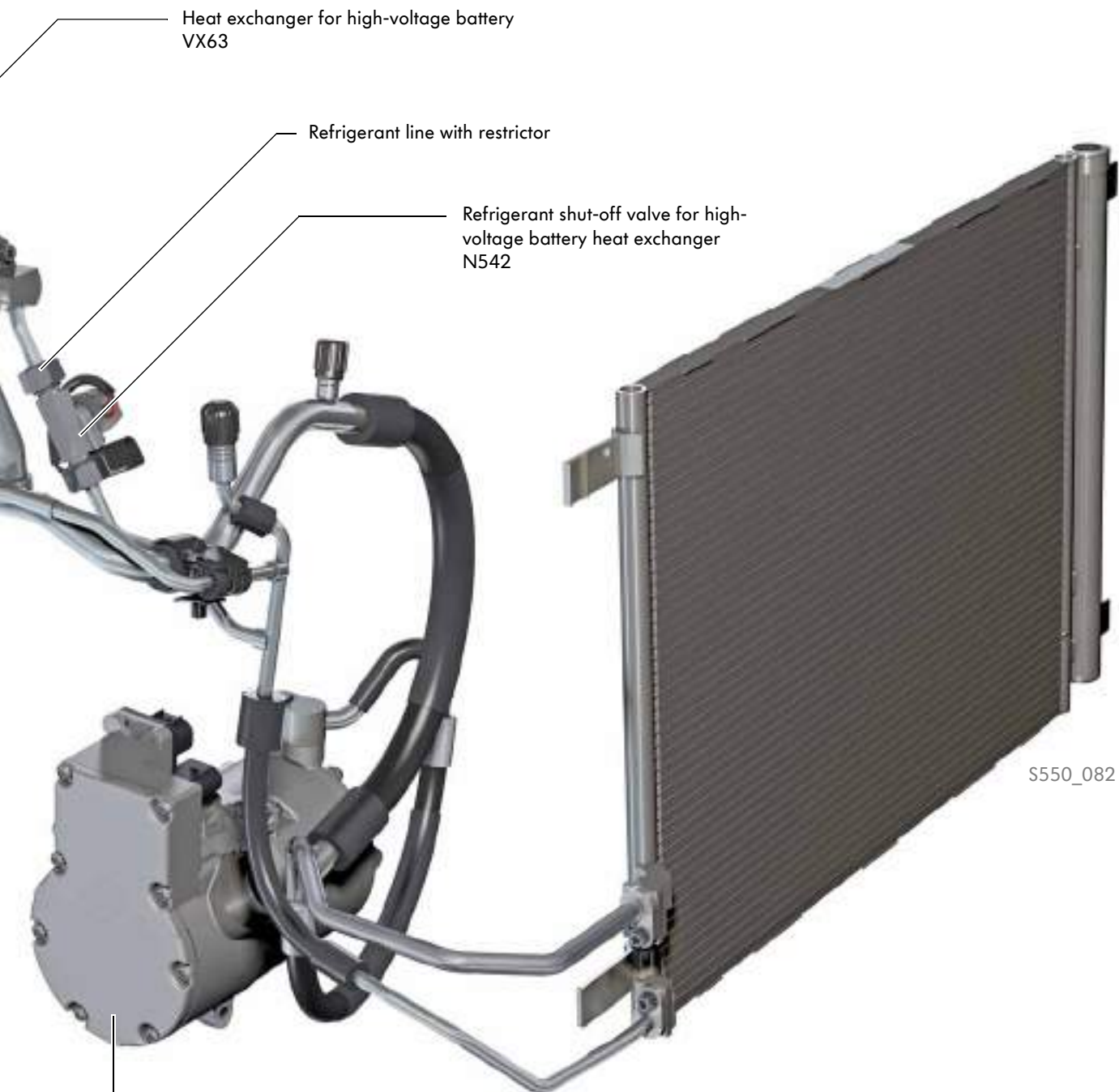


Refrigerant shut-off valve for heater and air conditioner unit N541

Pressure sender for refrigerant circuit G805



Please observe the special instructions in the workshop manual when flushing the refrigerant circuit.



Heat exchanger for high-voltage battery
VX63

Refrigerant line with restrictor

Refrigerant shut-off valve for high-
voltage battery heat exchanger
N542

S550_082

Electrical air conditioner
compressor V470

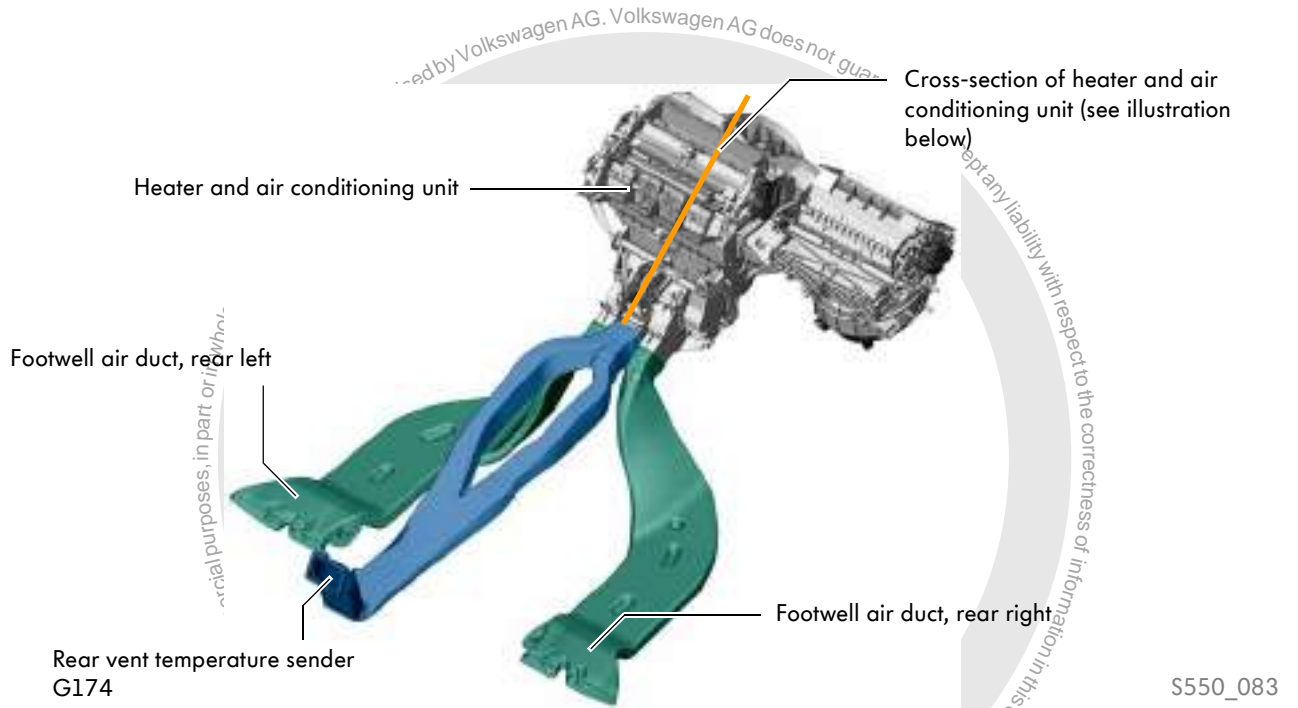
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Heating and air conditioning

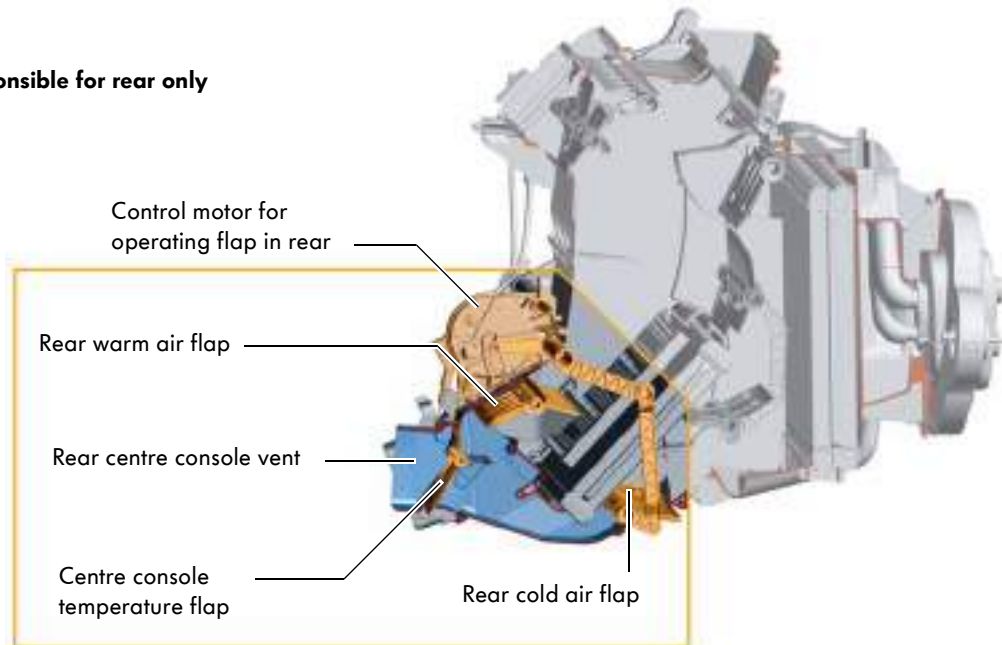
Air distribution in rear

The three climate zones are supplied by a heater and air conditioning unit fitted in the front. The new rear vent temperature sender G174 measures the air temperature at the vent. The air distribution is set on the heater and air conditioning unit and the front operating unit.



An additional flap control motor in the heater and air conditioning unit regulates the flow of air to the rear passengers. The flaps are controlled by the front operating unit.

Responsible for rear only

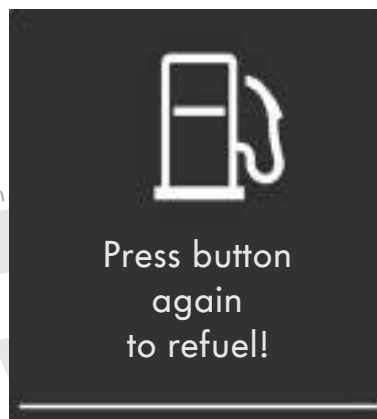


Things to note when refuelling

Before refuelling, the car should be prepared for refuelling by equalising the pressure in the fuel tank. After successful pressure equalisation, readiness for refuelling is indicated in the instrument cluster and remains activated for up to 17 minutes during which you can refuel.

Once the vehicle has been prepared for refuelling, the adjacent display will appear under the following conditions:

- The switch in the central locking actuator has been actuated in the tank flap.
- The vehicle is driven at a speed greater than 14 km/h.
- The 17 minutes have expired.



S550_052

Display in the instrument cluster when the vehicle has been prepared for refuelling, but then one of the conditions has been met.



If one of the conditions is met, the fuel tank shut-off valve will be closed and the display appears. Since the breather line is connected to the filler neck via a duct (see page 18), you can also refuel when the fuel tank shut-off valve is closed. The fuel vapours from the fuel tank escape via the filler neck.

The car cannot be prepared for refuelling:

- There is a fault in the fuel system.

If you press the fuel tank flap release button within 10 minutes after the indicator appears in the display, the fuel tank filler flap central locking actuator will be actuated by the onboard supply control unit. The tank flap is opened without pressure equalisation in some circumstances. Refuelling may then only be possible with caution until the fuel nozzle shuts off for the first time.



S550_053

Display in the instrument cluster when the vehicle cannot be prepared for refuelling.





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