

Service Training



Self-study Programme 542

The Passat 2015



The Passat 2015 – Generation 8

The Passat 2015 is being built using the modular transverse matrix (MQB) for the first time. This has allowed us to give the vehicle a considerably more dynamic look.

You can see this in the lowered body, longer wheelbase, larger wheels and a larger interior. The vehicle length is, however, almost the same as the previous model.

New design and technology details continue in the interior. Examples include a continuous, horizontal line of vents in the dash panel and the Active Info Display (a new instrument cluster) with interactive, digital instruments.

Emergency Assist, Trailer Assist and Traffic Jam Assist, which are being offered for the first time, ensure more safety and comfort alongside the established driver assist systems.

There is a completely new range of power units that is also based on the MQB.

The new 2.0l 176kW TDI biturbo engine is the leading product among the power units. Due to the high maximum torque of 500 Nm produced by this engine, it is combined with 4MOTION all-wheel drive and a 7-speed dual clutch gearbox in the Passat as standard.

Car-Net is taking the networking of vehicles with digital media and the Internet even further.

The range of mobile online services has been expanded again considerably with the Passat. For example, you can now search online for the cheapest petrol stations or the nearest available car parks and start navigation to them at the touch of a button.

You will find more information on the technology in the new Passat in this and other self-study programmes.



s542_001

This Self-study Programme describes the design and function of newly developed features. The contents will not be updated.

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



**Important
note**

Contents

Introduction	4
Body	12
Occupant protection	16
Power units	18
Power transmission	26
Heating and air conditioning	31
Running gear	34
Electrical system	36
Infotainment	48
Car-Net	52
Glossary	54



The glossary contains explanations of the terms HIGHLIGHTED in the various chapters of the self-study programme.



Introduction



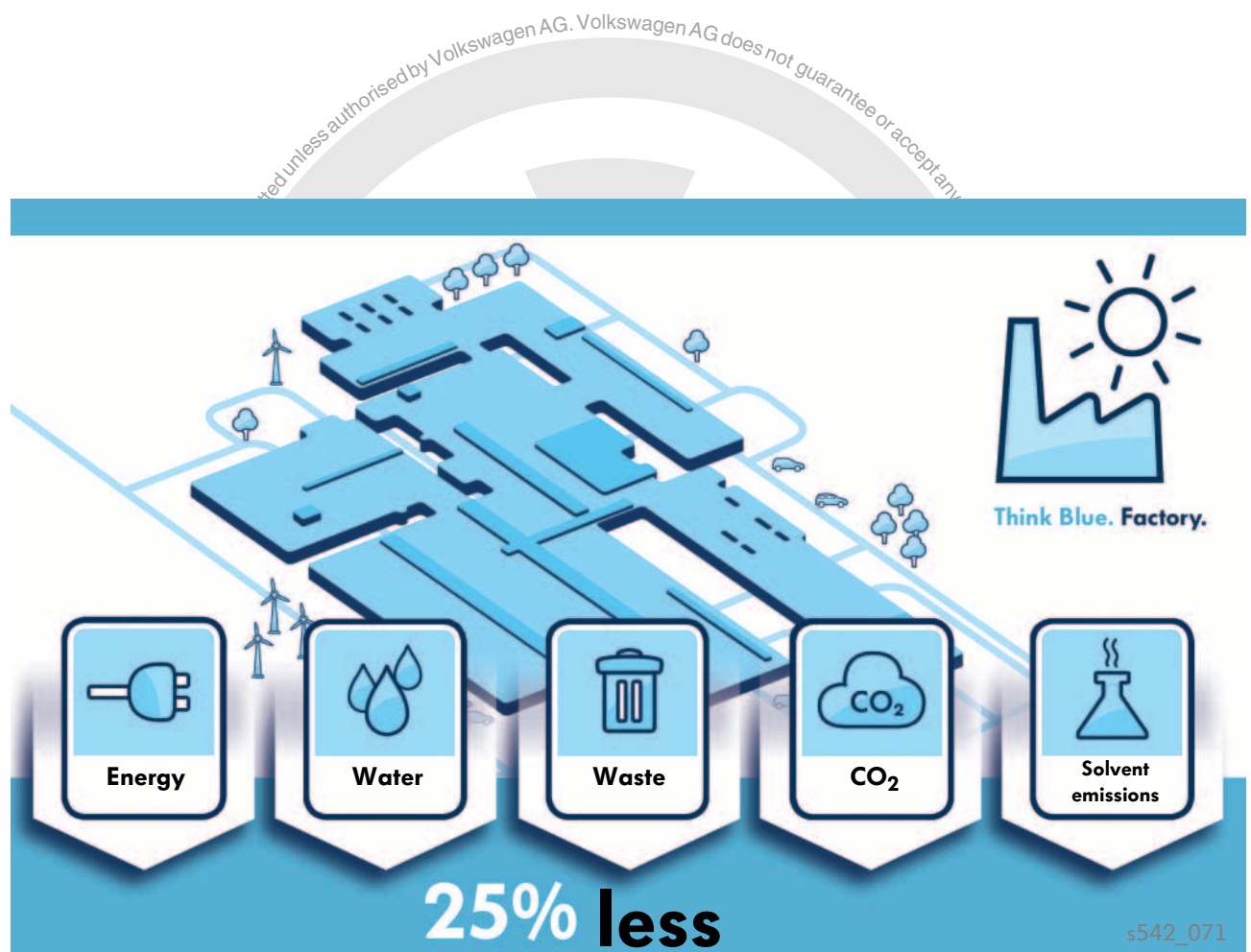
The environmentally-friendly Passat 2015

Vehicle production

To reach its goal of becoming the world's most sustainable car manufacturer by 2018 and achieving a sustainable reduction in environmental burdens across the board, Volkswagen looks at the life cycle of a vehicle from development to recycling. Production using the "Think Blue. Factory." programme for all production sites also makes an important contribution to this. The aim is to reduce the environmental impact of vehicle production and the resources it uses by 25 percent from 2010 to 2018.

More than 40 measures to reach this goal are being implemented at the Volkswagen Emden factory where the Passat 2015 is built. The main focuses of these measures include:

- Expanding the wind power plants used to generate electricity that is supplied to the factory's own mains system
- District heating from a biomass power plant
- Body assembly using the latest efficient factory equipment
- Use of geothermics for cooling during production welding processes
- Water savings due to a closed circuit system for factory hall heating





Vehicle technology

The new technology and innovations in the Passat 2015 help improve the environmental performance compared with the previous model.

This includes the following measures:

- Fourth generation of Passat BlueMotion
- Second generation start/stop system with coasting function and expanded start/stop display
- Think Blue. Trainer, fully integrated into the instrument cluster
- Driving mode selection, e.g. "Eco" driving mode
- All power units comply with the EU6 emission standard
- Weight savings of up to 85 kg thanks to improvements to the engine, body and equipment assembly groups.

These and other activities represent our contribution to sustainably improving the environmental footprint of the new Passat.



You can find full information on Think Blue. at the following website: www.volkswagen.de/thinkblue

ed by Volkswagen AG. Volkswagen AG does not guar

Blue Mobility.

with respect to the correctness of information.

s542_073

Protection... wagen AG.

Introduction



Product features of the Passat 2015

The illustration lists new and important product features of the Passat Saloon and Passat Estate.

- Progressive steering combined with DCC
- 2.0l 176 kW TDI biturbo engine
- LED headlights with variable light distribution
- Traffic Jam Assist
- Active Info Display



s542_019

- Weight-optimised body
- Emergency Assist
- Easy open/easy close
- Trailer Assist
- Car-Net
- LED tail lights



- Start/stop system with energy recovery for all engines



The equipment in all assembly groups varies from country to country.

Distinguishing features of the Passat 2015



Radiator grille with new headlight design

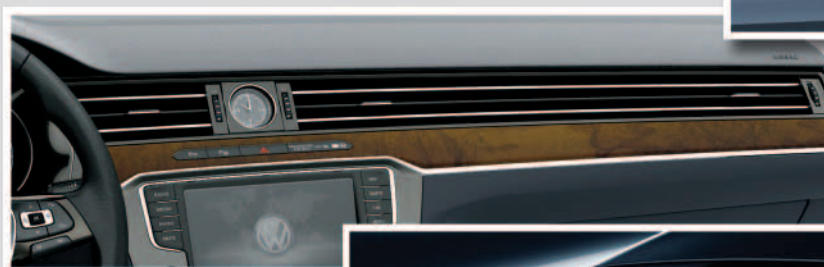


Exterior mirror on door shoulder line

Door handles integrated into character line



Quarter window on rear doors (estate)



Horizontal line of vents in dash panel

LED tail lights



Trapezoidal tailpipe trims

any liability with respect to the correctness of information in this document

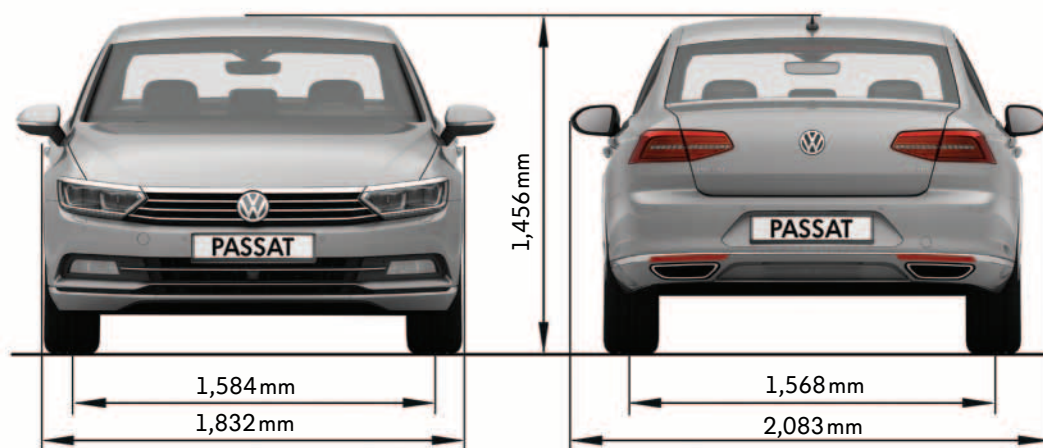
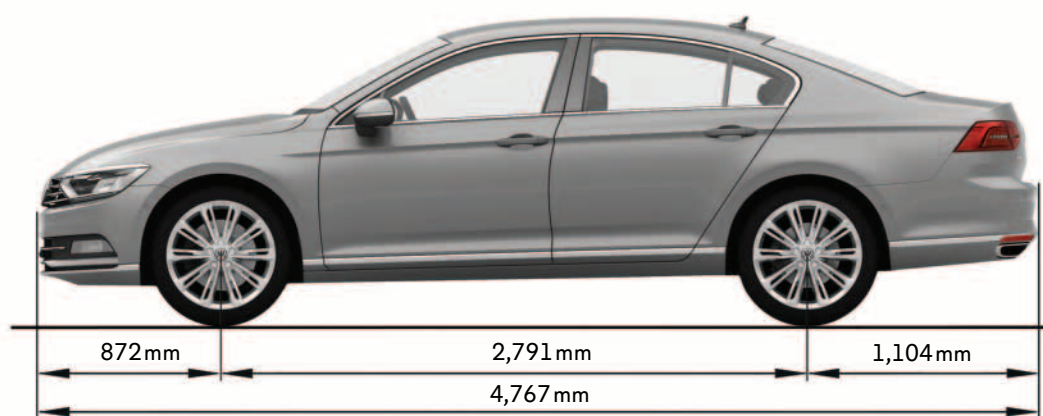
Introduction



Technical data

The data for the Passat 2015 Saloon are based on a model with a 1.4 l 92 kW TSI engine, a 6-speed manual gearbox MQ200, 215/60 R16 tyres, without the driver and with standard equipment.

Exterior dimensions and weights



s542_005

Exterior dimensions

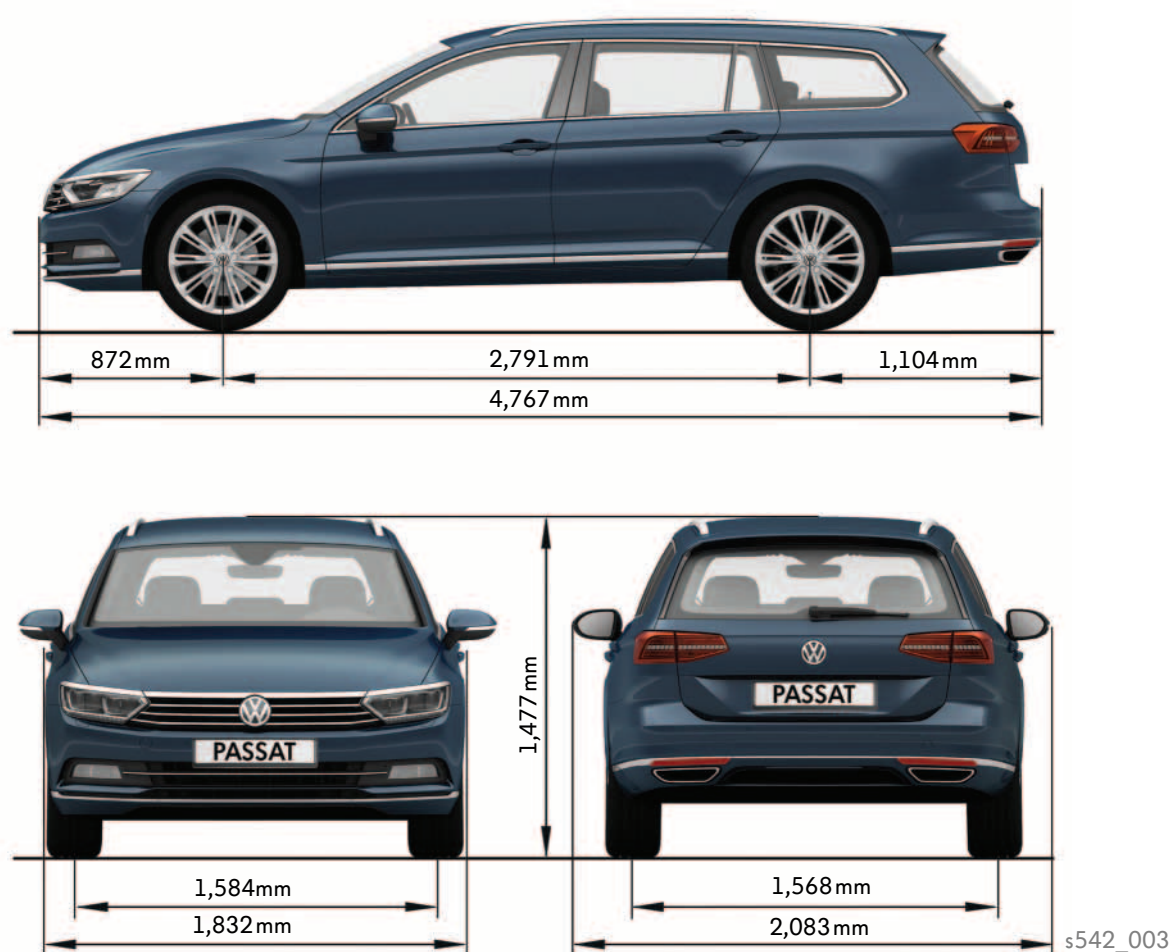
Passat Saloon	2011	2015
Length	4,769 mm	4,767 mm
Width incl. exterior mirrors	2,062 mm	2,083 mm
Height	1,470 mm	1,456 mm
Wheelbase	2,712 mm	2,791 mm
Track width at front	1,552 mm	1,584 mm
Track width at rear	1,551 mm	1,568 mm
Turning circle	11.4 m	11.7 m

Weights/other data

Passat Saloon	2011	2015
Gross vehicle weight rating	1,990 kg	1,910 kg
DIN kerb weight*	1,365 kg	1,287 kg
Max. roof load	100 kg	100 kg
Max. trailer weight (braked)	1,400 kg	1,500 kg
Fuel tank capacity	70 litres	66 litres
Drag coefficient	0.291 c _d	0.277 c _d



The data for the Passat 2015 Estate are based on a model with the 1.4 l 92 kW TSI engine, a 6-speed manual gearbox MQ200, 215/60 R16 tyres, without the driver and with standard equipment.



Exterior dimensions

Passat Estate	2011	2015
Length	4,771 mm	4,767 mm
Width incl. exterior mirrors	2,062 mm	2,083 mm
Height	1,479 mm	1,477 mm
Wheelbase	2,712 mm	2,791 mm
Track width at front	1,552 mm	1,584 mm
Track width at rear	1,551 mm	1,568 mm
Turning circle	11.4 m	11.7 m

Weights/other data

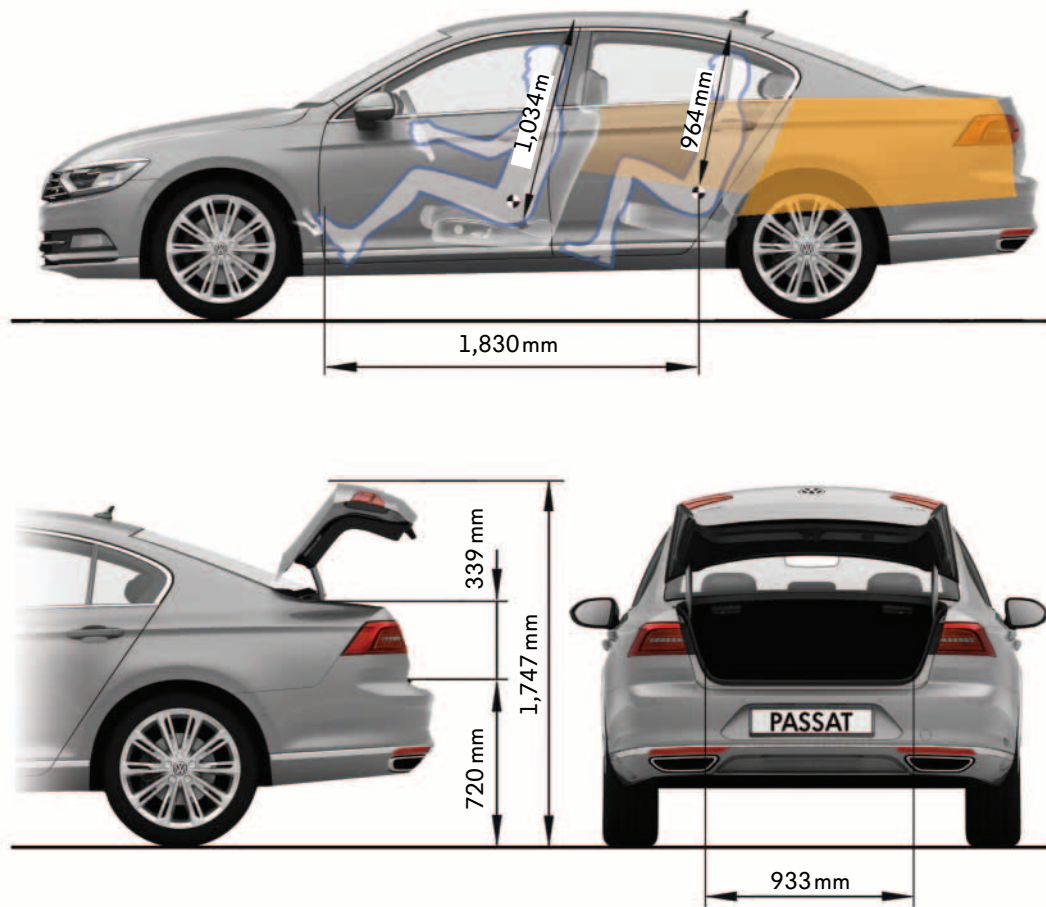
Passat Estate	2011	2015
Gross vehicle weight rating	2,070 kg	1,960 kg
DIN kerb weight*	1,402 kg	1,314 kg
Max. roof load	100 kg	100 kg
Max. trailer weight (braked)	1,400 kg	1,500 kg
Fuel tank capacity	70 litres	66 litres
Drag coefficient	0.298 c _d	0.280 c _d

* DIN \triangleq Deutsche Industrie Norm (German Industry Standard)

Introduction



Interior dimensions and volumes



s542_023

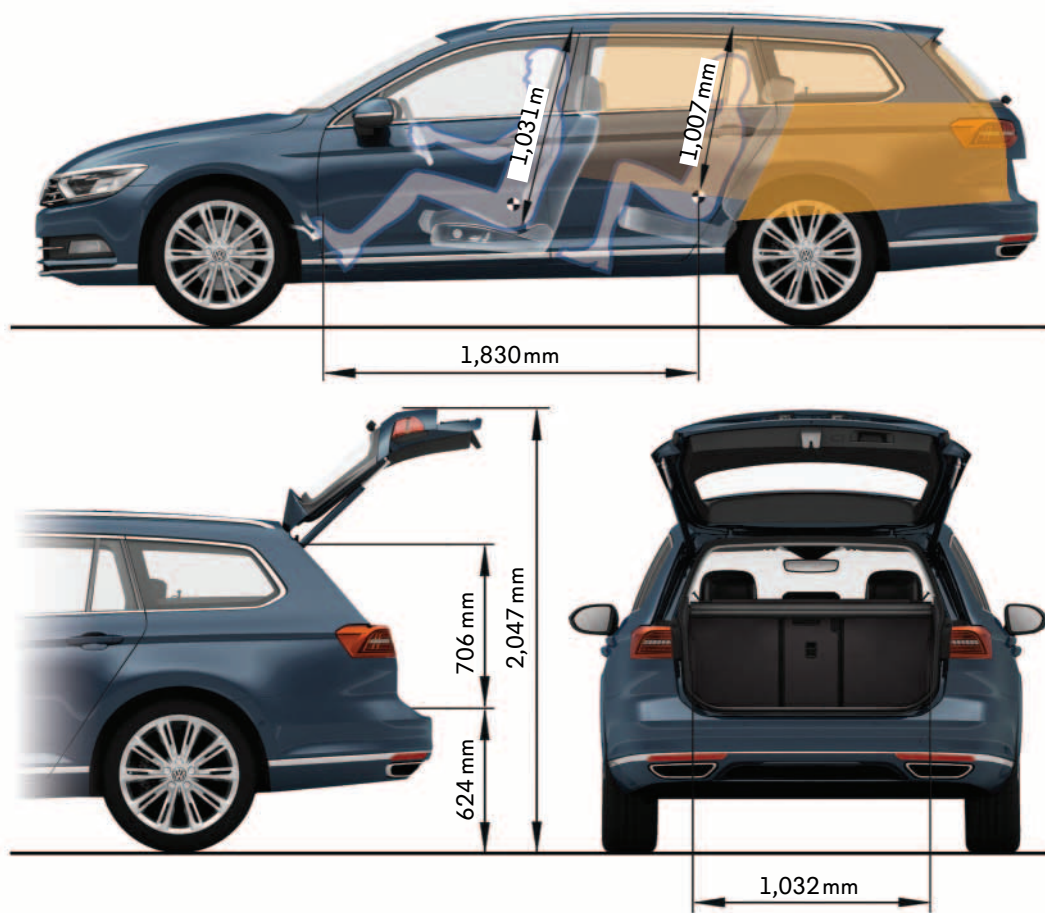
Interior dimensions and volumes

Passat Saloon	2011	2015
Interior length	1,797 mm	1,830 mm
Luggage compartment volume	565 litres	586 litres
Luggage compartment volume with rear seat backrest folded down	1,091 litres	1,152 litres
Height of open rear lid	1,766 mm	1,747 mm
Height of load sill	729 mm	720 mm
Height of luggage compartment aperture	332 mm	339 mm

Passat Saloon	2011	2015
Width of luggage compartment aperture at bottom	891 mm	933 mm
Through-load width between wheel housings	1,014 mm	1,005 mm
Front max. headroom	1,022 mm	1,034 mm
Headroom, 2nd seat row	961 mm	964 mm
Kneeroom, 2nd seat row	76 mm	116 mm



AG Volkswagen



apt any liability with respect to the correctness of information in this document.

s542_025

Interior dimensions and volumes

Passat Estate	2011	2015
Interior length	1,797 mm	1,830 mm
Luggage compartment volume	603 litres	650 litres
Luggage compartment volume with rear seat backrest folded down	1,731 litres	1,780 litres
Height of open tailgate	2,027 mm	2,047 mm
Height of load sill	624 mm	624 mm
Height of luggage compartment aperture	719 mm	706 mm

Passat Estate	2011	2015
Width of luggage compartment aperture at bottom	1,014 mm	1,032 mm
Through-load width between wheel housings	1,003 mm	1,005 mm
Front max. headroom	1,018 mm	1,031 mm
Headroom, 2nd seat row	980 mm	1,007 mm
Kneeroom, 2nd seat row	76 mm	116 mm

Body

Body structure

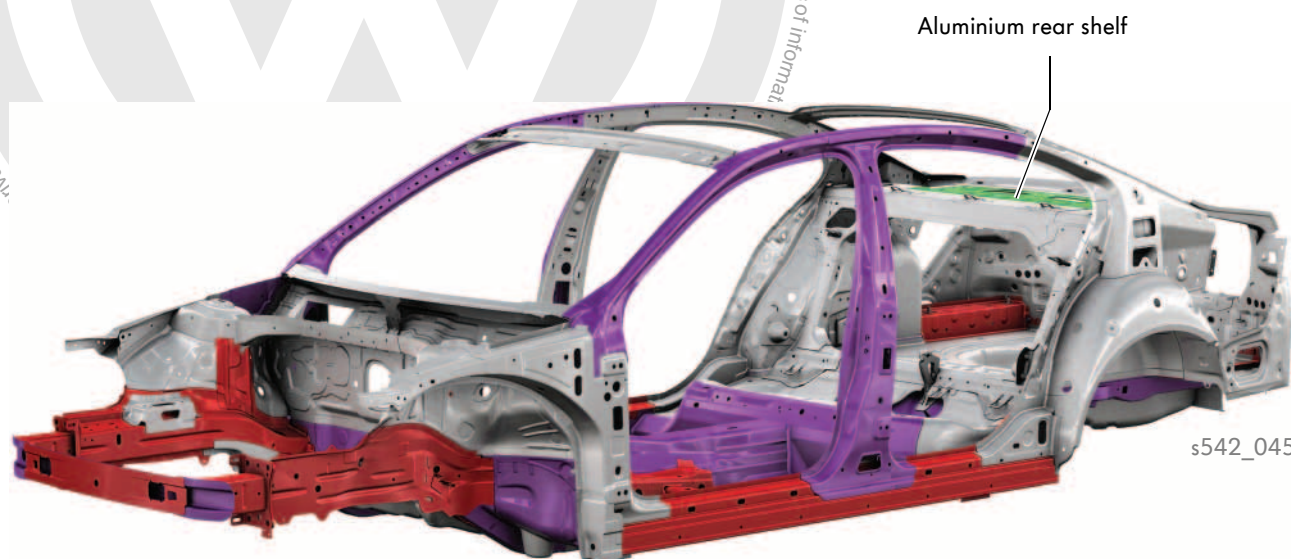
The new Passat is based on the **MQB** modular transverse matrix. Its wheelbase is 78 mm longer than the previous model. This improves comfort and increases the interior dimensions.

As on the previous model, the use of laser welding technology on the door and window flanges has allowed the access dimensions to be enlarged thanks to narrower welding flanges.

The reduced cross-section of the A-pillars has improved vision diagonally to the front.

Aluminium is also being used in the body structure of the new Passat for the first time. The rear shelf made from aluminium is welded to the surrounding steel components using resistive elements.

Passat Saloon



Key

Grey square	Conventional steel
Red square	High-strength steel
Purple square	Hot-formed steel
Green square	Aluminium

Lightweight design

The body structure of the new Passat has been made 21 kg lighter than the previous model. At the same time, stricter requirements have been met and larger dimensions have been achieved on both the saloon and the estate. This is the result of consistently pursued geometric lightweight design and it shows the positive effect of a further increase in the use of high-strength and hot-formed steels. The use of hot-formed steels in the new Passat has risen from 15% to 27% compared with the previous model.



Passat Estate

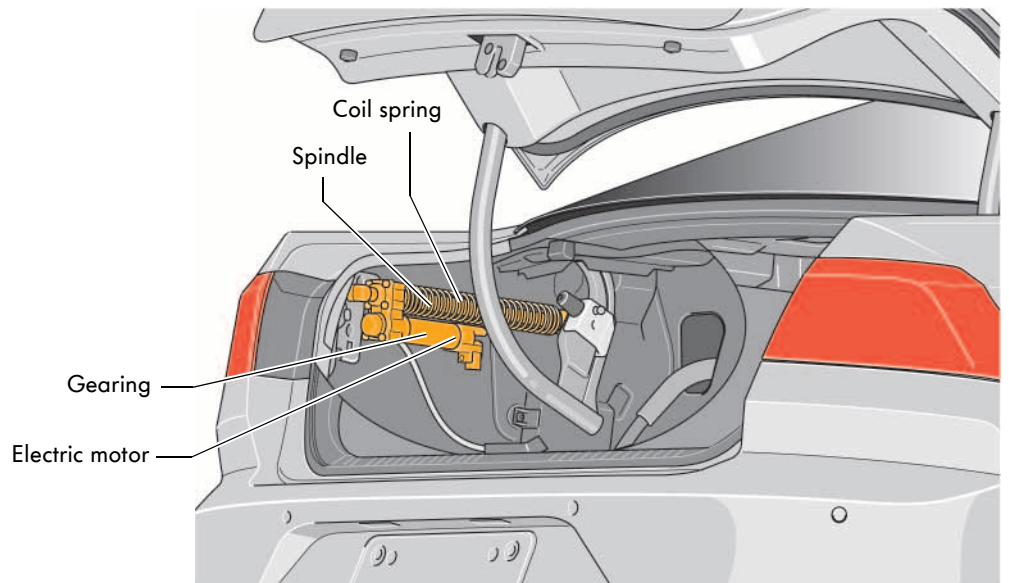


You will find further information on the body in Self-study Programme no. 544. "The Passat 2015 – Body and Occupant Protection".

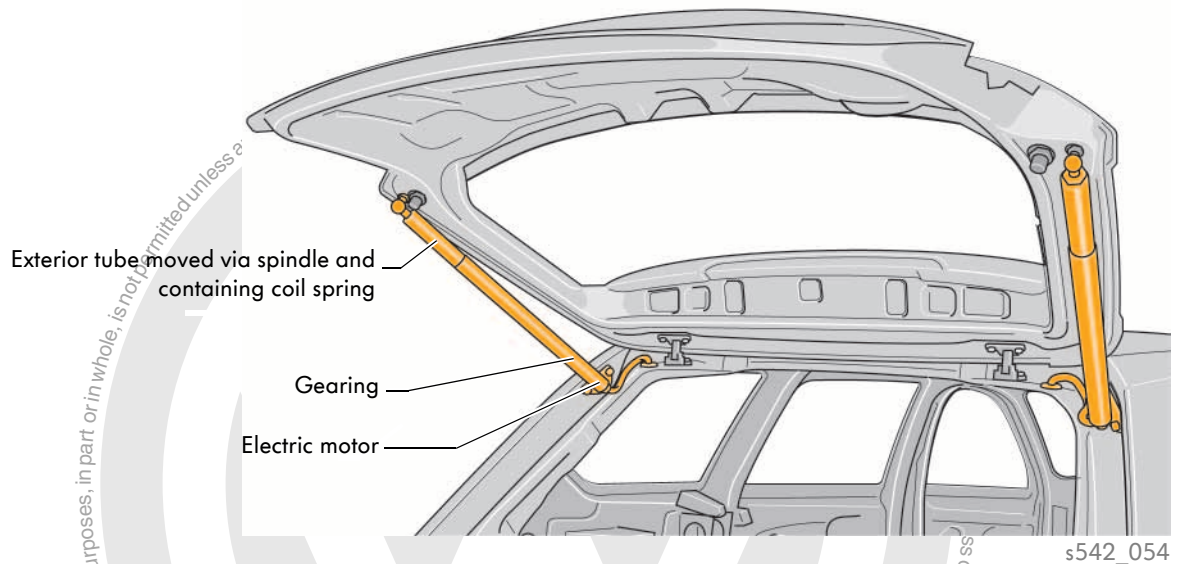
Rear lid/tailgate drives

Electrically operated rear lid/tailgate drives are available for the saloon and the estate. Both drives are spindle drives. The rear lid drive on the saloon is only on the left-hand side.

Saloon rear lid drive



Estate tailgate drive



You will find further information on the basic structure of the tailgate drive (Passat Estate) in Self-study Programme no. 449 "The Touareg 2011".

Luggage compartment floor concept in the estate

A variable luggage compartment floor is available for the Passat Estate. It can be moved to an upper or a lower position using one hand. When the rear seat backrest is folded down, the upper position creates a large, almost flat cargo area. More cargo space is available to customers in the lower position. In addition, the luggage compartment cover and the net partition can be stowed under the luggage compartment floor.



s542_053

Moving luggage compartment floor to upper position:
pull the luggage compartment floor to the rear



s542_055

Changing the position:
push the luggage compartment floor to the front/
downwards



s542_057

Moving luggage compartment floor to lower position:
fold the luggage compartment floor downwards

Safety equipment

The Passat 2015 features the following safety equipment:

- Single-stage driver airbag
- Single-stage front passenger airbag with deactivation switch
- Front side airbags
- Rear side airbags (optional)
- Left and right curtain airbags
- Driver side knee airbag (optional)
- Three-point seat belts with tensioners on front seats
- Three-point seat belts on rear seats, optional belt tensioners
- Reversible belt tensioners on front seats (optional)
- Front belt force limiter
- TOP TETHER SYSTEM





s542_061

Proactive occupant protection system

The proactive occupant protection system is available as an optional extra for the Passat 2015. This system intervenes as soon as one of the following criteria is met:

- Emergency braking
- Hazard braking
- Unstable driving states
- Brake intervention by **FRONT ASSIST**
- A serious risk of collision is detected by the front sensors



If the system recognises one of these potential accident situations, the vehicle occupants and the vehicle will be prepared for a possible accident. The automatic, reversible tensioning of the seat belt holds the driver and front passenger in their seats to ensure the airbag and belt systems provide the best possible protection.

In addition, the side windows and sliding sunroof are closed, leaving only a small gap open. Closing the windows allows the curtain airbags to provide optimum support and thus the best possible protection.




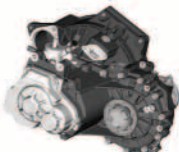


If the dangerous situation passes and the driving dynamics are restored to a stable condition, the seat belts are slackened again.



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

Power units










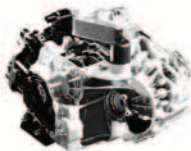

Engine and gearbox combinations

Gearbox	Petrol engines	
	1.4 92 kW TSI engine CZCA	1.4 110 kW TSI engine with ACT*** CZEA
6-speed manual gearbox MQ200-6F* 0AJ		
6-speed manual gearbox MQ250-6F* 02S		
7-speed dual clutch gearbox DQ200-7F* 0AM/0CW**		

* 6F = 6-speed front-wheel drive, 6A = 6-gear all-wheel drive, 7A = 7-speed all-wheel drive

** Due to the introduction of the modular transverse matrix to the Passat, the installation position of the dual clutch gearbox has changed as has communication between the mechatronic unit and the data bus system. This has led to a change in the codes used for the dual clutch gearboxes. The dual clutch gearbox 0AM is now 0CW.

*** Engine with Active Cylinder Management ACT

Diesel engines	1.6 88 kW TDI engine CVRB	2.0 110 kW TDI engine CRLB	2.0 140 kW TDI engine DDAA	2.0 176 kW TDI biturbo engine CUAA
				
Gearbox				
6-speed manual gearbox MQ250-6F* 02S				
6-speed manual gearbox MQ350-6F* 02Q				
7-speed dual clutch gearbox DQ200-7F* 0AM/0CW**				
6-speed dual clutch gearbox DQ250-6F(6A)* 02E/0D9**				
7-speed dual clutch gearbox DQ500-7A* 0DL				

* 6F = 6-speed front-wheel drive, 6A = 6-gear all-wheel drive, 7A = 7-speed all-wheel drive

** Due to the introduction of the modular transverse matrix to the Passat, the installation position of the dual clutch gearbox has changed as has communication between the mechatronic unit and the data bus system. This has led to a change in the codes used for the dual clutch gearboxes. The dual clutch gearbox 02E is now 0D9.

Power units

1.4 | 92 kW TSI engine

This engine belongs to the EA211 petrol engine series and has been taken from the Golf 2013.

Technical features

- Cylinder head with integrated exhaust manifold
- Camshafts driven by a toothed belt
- Coolant pump integrated into the thermostat housing
- Coolant pump driven by the exhaust camshaft via a toothed belt
- Turbocharger module with electric charge pressure positioner
- Inlet camshaft with variable valve timing
- External gear wheel oil pump with two-stage oil pressure regulation

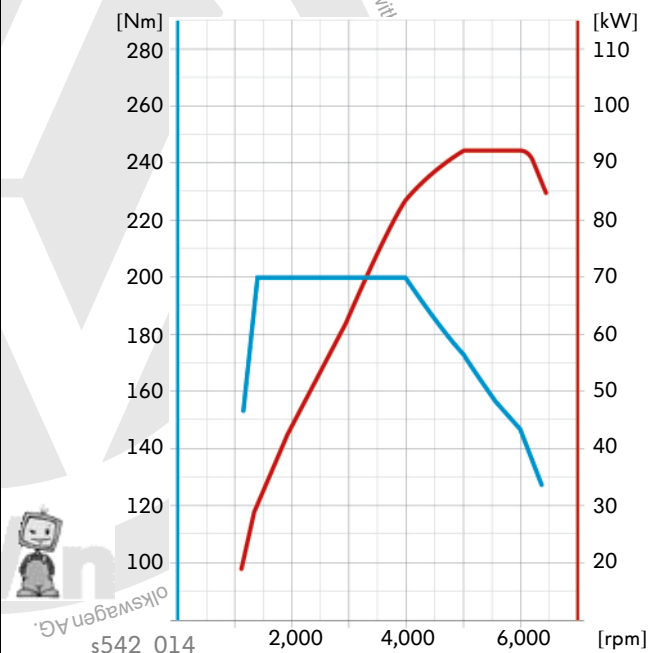


s542_033

Technical data

Engine code	CZCA
Type	4-cylinder in-line engine
Displacement	1,395 cm ³
Bore	74.5 mm
Stroke	80.0 mm
Valves per cylinder	4
Compression ratio	10.5:1
Maximum output	92 kW at 5,000–6,000 rpm
Maximum torque	200 Nm at 1,400–4,000 rpm
Engine management system	Bosch Motronic MED 17.5.25
Fuel	Super unleaded RON 95
Exhaust gas treatment	Three-way catalytic converter, one step-type lambda probe upstream of the catalytic converter and one downstream
Emission standard	EU6

Torque and power diagram



1.4 | 110 kW TSI engine with Active Cylinder Management (ACT)

This engine has previously been used in the Polo BlueGT and the Golf. It is the first engine with Active Cylinder Management to feature in the Passat.

Technical features

- Active Cylinder Management ACT
- Toothed belt drive
- Cylinder head with integrated exhaust manifold
- Coolant pump integrated into the thermostat housing
- Coolant pump driven by the exhaust camshaft via a toothed belt
- Turbocharger module with electric charge pressure positioner
- Inlet and exhaust camshafts with variable valve timing
- External gear wheel oil pump with two-stage oil pressure regulation

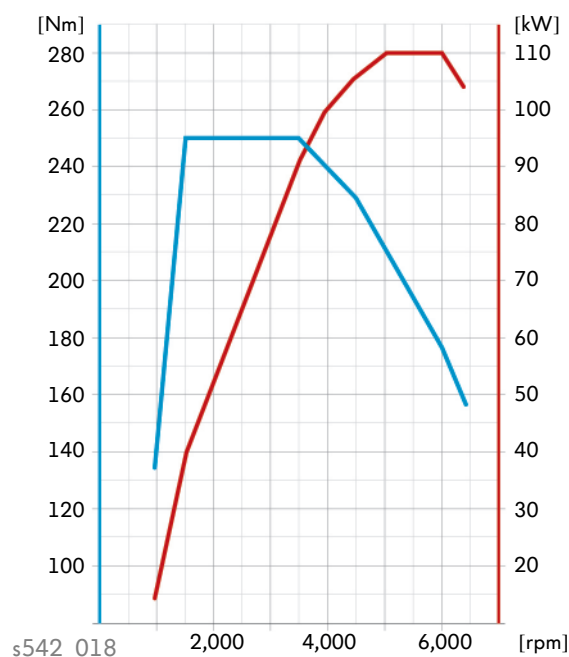


Further information can be found in self-study programme no. 510 "Active Cylinder Management (ACT) in the 1.4 | 103 kW TSI engine".

Technical data

Engine code	CZEA
Type	4-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
Maximum output	110 kW at 5,000–6,000 rpm
Maximum torque	250 Nm at 1,500–3,500 rpm
Engine management system	Bosch Motronic MED 17.5.21
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



Power units

1.6 | 88 kW TDI engine

This power unit is the entry-level diesel engine for the new Passat 2015.

Technical features

- Thermal management using on-demand coolant pump
- Water-cooled charge air cooler
- Emission control module with oxidising/
NO_x storage catalytic converter and diesel particulate filter
- Dual-circuit exhaust gas recirculation system consisting of high-pressure and low-pressure exhaust gas recirculation

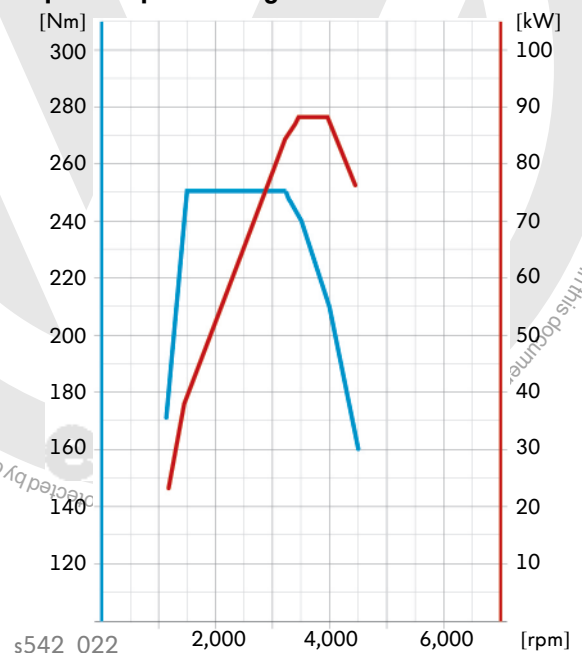


s542_027

Technical data

Engine code	CVRB
Type	4-cylinder in-line engine
Displacement	1,598 cm ³
Bore	79.5 mm
Stroke	80.5 mm
Valves per cylinder	4
Compression ratio	16.2:1
Maximum output	88 kW at 3,500–4,000 rpm
Maximum torque	250 Nm at 1,500–3,250 rpm
Engine management system	Bosch EDC 17
Fuel	Diesel as per EN 590
Exhaust gas treatment	Dual-circuit exhaust gas recirculation system, oxidising and NO _x storage catalytic converter, diesel particulate filter
Emission standard	EU6

Torque and power diagram



2.0 | 110 kW TDI engine

This engine has already featured in a variety of Volkswagen models.

Technical features

- Variable valve timing
- Thermal management using on-demand coolant pump
- Water-cooled charge air cooler
- Emission control module with oxidising/
NO_x storage catalytic converter and diesel particulate filter
- Dual-circuit exhaust gas recirculation system consisting of high-pressure and low-pressure exhaust gas recirculation

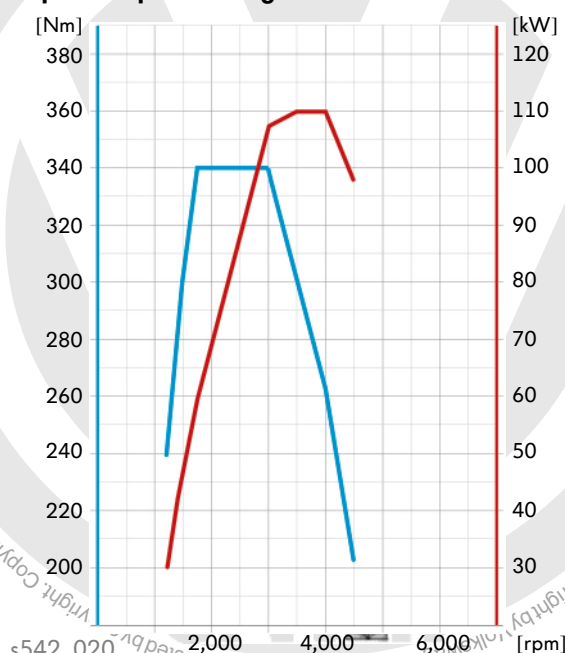


s542_027

Technical data

Engine code	CRLB
Type	4-cylinder in-line engine
Displacement	1,968 cm ³
Bore	81.0 mm
Stroke	95.5 mm
Valves per cylinder	4
Compression ratio	16.2 : 1
Maximum output	110 kW at 3,500–4,000 rpm
Maximum torque	340 Nm at 1,750–3,000 rpm
Engine management system	Bosch EDC 17
Fuel	Diesel as per EN 590
Exhaust gas treatment	Dual-circuit exhaust gas recirculation system, oxidising and NO _x storage catalytic converter, diesel particulate filter
Emission standard	EU6

Torque and power diagram



Power units

2.0 | 140 kW TDI engine

This engine is used in the Golf GTD. However, in the Passat 2015, it delivers 140 kW instead of 135 kW. The higher output has been achieved by means of a larger turbocharger and modified engine software.

Technical features

- Thermal management using on-demand coolant pump
- Water-cooled turbocharger
- Water-cooled charge air cooler
- Emission control module with oxidizing catalytic converter and diesel particulate filter
- Dual-circuit exhaust gas recirculation consisting of high-pressure and low-pressure exhaust gas recirculation
- SCR exhaust gas treatment system

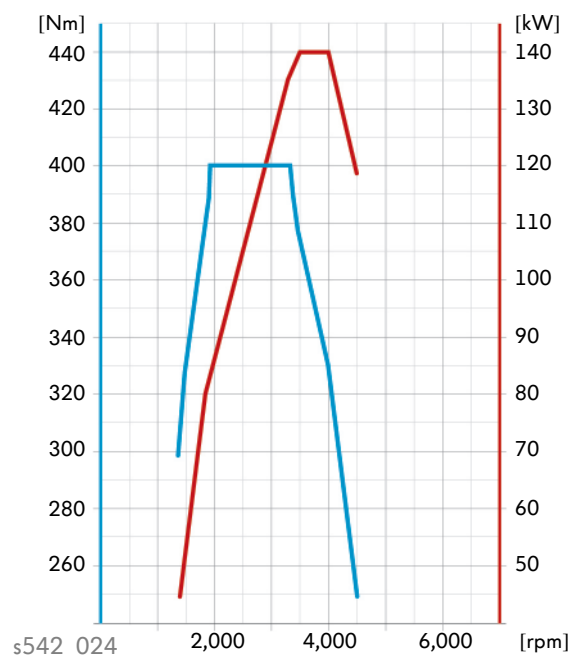


s542_027

Technical data

Engine code	DDAA
Type	4-cylinder in-line engine
Displacement	1,968 cm ³
Bore	81.0 mm
Stroke	95.5 mm
Valves per cylinder	4
Compression ratio	15.5 : 1
Maximum output	140 kW at 3,500–4,000 rpm
Maximum torque	400 Nm at 1,900–3,300 rpm
Engine management system	Bosch EDC 17
Fuel	Diesel as per EN 590
Exhaust gas treatment	Dual-circuit exhaust gas recirculation system, oxidising catalytic converter, diesel particulate filter and selective catalytic reduction
Emission standard	EU6

Torque and power diagram

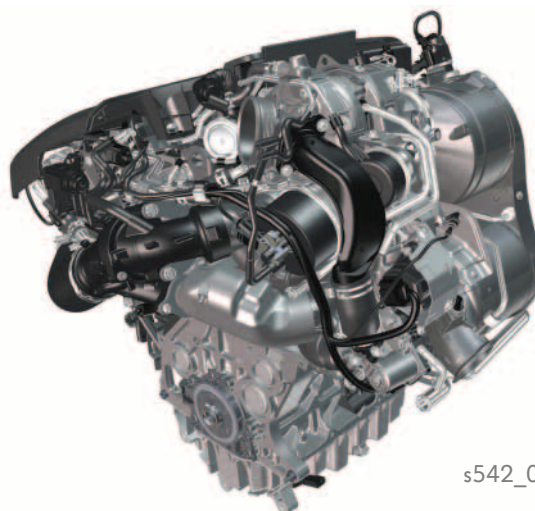


2.0 | 176 kW TDI biturbo engine

The 2.0 | TDI biturbo engine is the most powerful diesel engine for the Passat 2015. It features a newly developed turbocharger system consisting of a high-pressure and a low-pressure turbocharger. Its two-stage turbocharger system allows very good power development at both low and high engine speeds.

Technical features

- Two-stage turbocharger system consisting of high-pressure and low-pressure turbochargers
- Thermal management using on-demand coolant pump
- Water-cooled charge air cooler
- Emission control module with oxidizing catalytic converter and diesel particulate filter
- Dual-circuit exhaust gas recirculation consisting of high-pressure and low-pressure exhaust gas recirculation
- SCR exhaust gas treatment system
- Common rail fuel injection with maximum injection pressure of 2,500 bar



s542_079

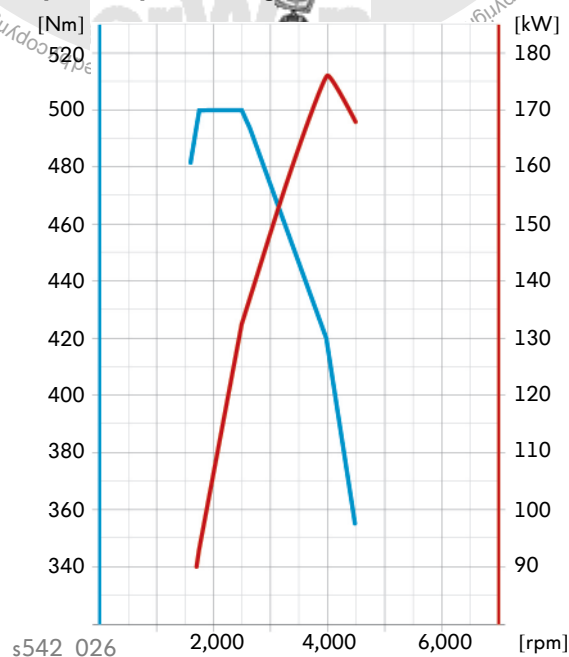


You will find further information in self-study programme no. 547
“The 2.0 | 176 kW TDI Biturbo Engine from the EA288 Diesel Engine Series”.

Technical data

Engine code	CUAA
Type	4-cylinder in-line engine
Displacement	1,968 cm ³
Bore	81.0 mm
Stroke	95.5 mm
Valves per cylinder	4
Compression ratio	15.5:1
Maximum output	176 kW at 4,000 rpm
Maximum torque	500 Nm at 1,750–2,500 rpm
Engine management system	Bosch EDC 17
Fuel	Diesel as per EN 590
Exhaust gas treatment	Dual-circuit exhaust gas recirculation system, oxidising catalytic converter, diesel particulate filter and selective catalytic reduction
Emission standard	EU6

Torque and power diagram



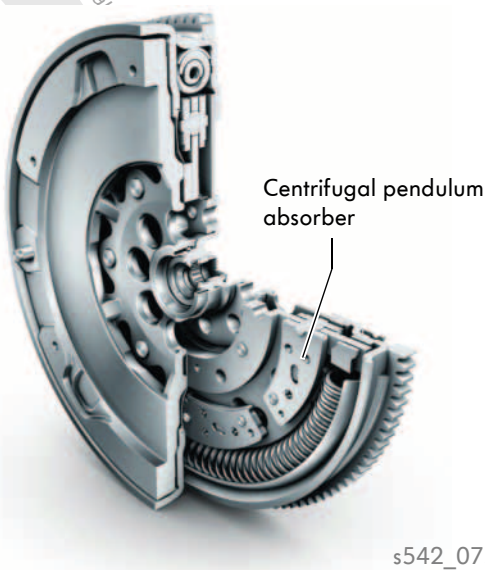
s542_026

Dual-mass flywheel with centrifugal pendulum absorber

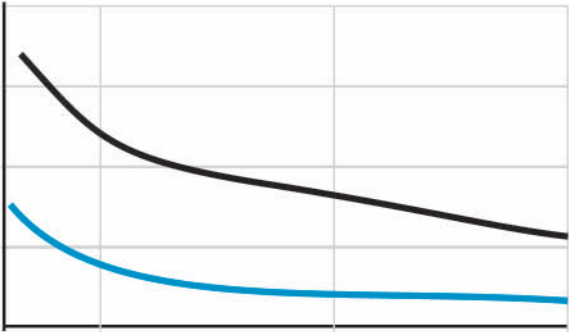
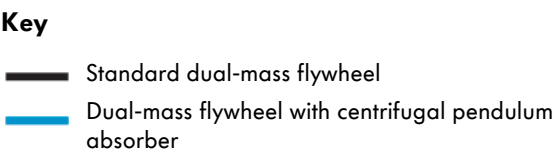
Purpose

The purpose of the dual-mass flywheel (DMF) is to dampen torsional vibrations produced by the engine. These vibrations should not reach the drive train. They can cause transmission rattle and body booming as well as load change vibrations and noises.

Due to the constantly rising demands placed on engine technology, for example downsizing and downspeeding (long gear ratios and low engine speeds), the demands placed on the dual-mass flywheel have also risen. Engine vibrations need to be dampened further to allow the engine to run at lower speeds and thus save fuel. Centrifugal pendulum absorbers have been added to the dual-mass flywheel to isolate torsional vibrations. The centrifugal pendulum absorbers reduce the rotational vibrations by vibrating in the opposite direction. Undesirable torsional vibrations at low rpm ranges are eliminated almost completely.



Torsional vibrations

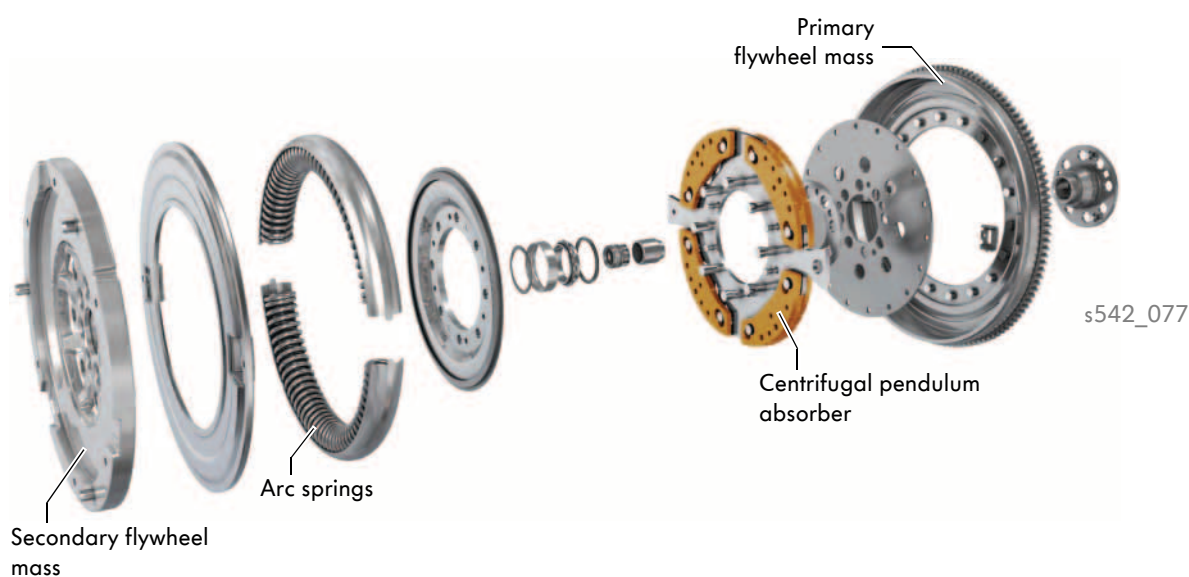
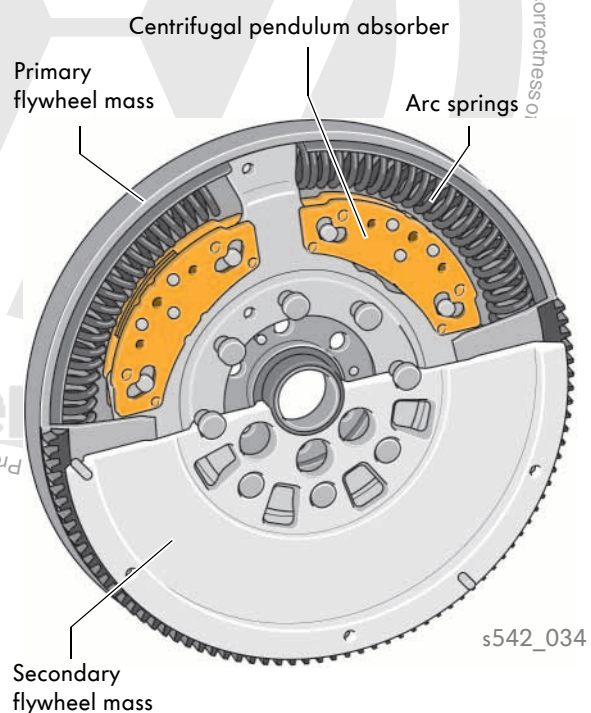


Engine speed in rpm
s542_028

Design

In the dual-mass flywheel (DMF), the conventional flywheel mass is split into the primary flywheel mass and the secondary flywheel mass. The primary flywheel mass is connected to the crankshaft. The secondary flywheel mass is connected to the gearbox. The arc springs connect the two flywheel masses to form a spring-damping system.

The centrifugal pendulum absorbers are fitted on the secondary side of the dual-mass flywheel, behind the arc springs. As a result, the pendulum mass required for damping is lower than on the primary side.



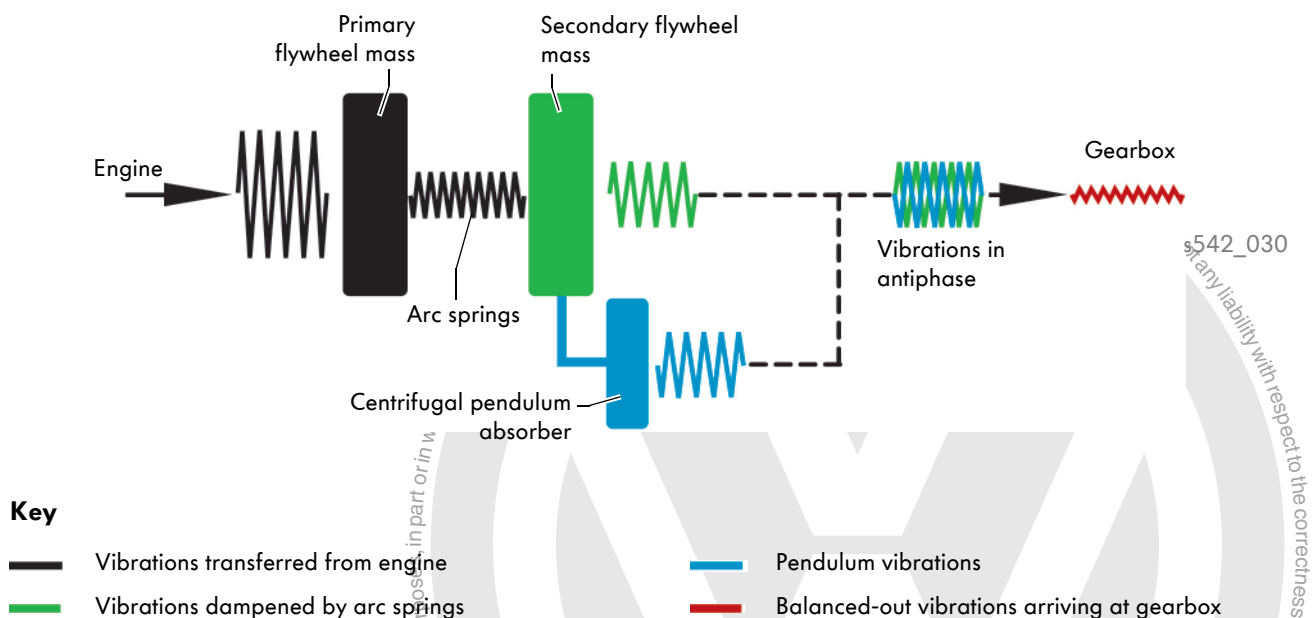
Power transmission

Function

The vibrations induced by the engine are transferred from the primary side of the dual-mass flywheel to the arc springs where they are dampened. The dampened vibrations are balanced out by the pendulum oscillations and thus eliminated. The vibrations that reach the gearbox are greatly reduced even at low engine speeds.

The centrifugal pendulum absorbers work in relation to the vibrations. At low engine speeds, the pendulums can vibrate at a greater amplitude since the centrifugal force acting on the pendulums is low. As the engine speed increases, the pendulum travel is reduced due to the rising centrifugal force.

Schematic diagram



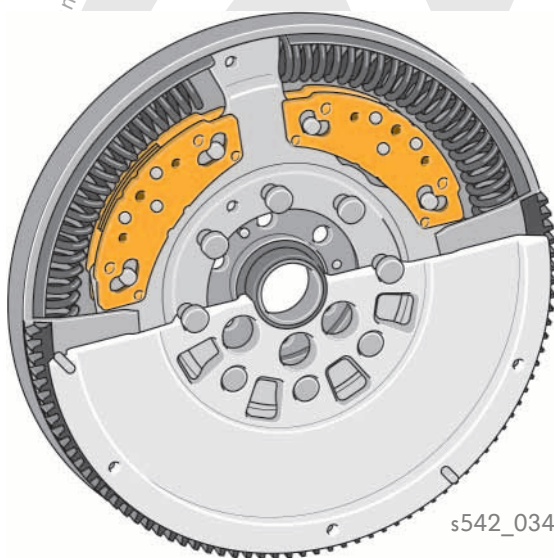
If you lift the dual-mass flywheel or turn it by hand, you may hear rattling noises coming from the centrifugal pendulum absorbers in their floating bearings. These noises result from the design and cannot be heard when the vehicle is driven.

Types

Two types of dual-mass flywheel with centrifugal pendulum absorber are used in the Passat depending on which engine and gearbox are fitted:

- The dual-mass flywheel from LuK
- The dual-mass flywheel from ZF

Dual-mass flywheel from LuK

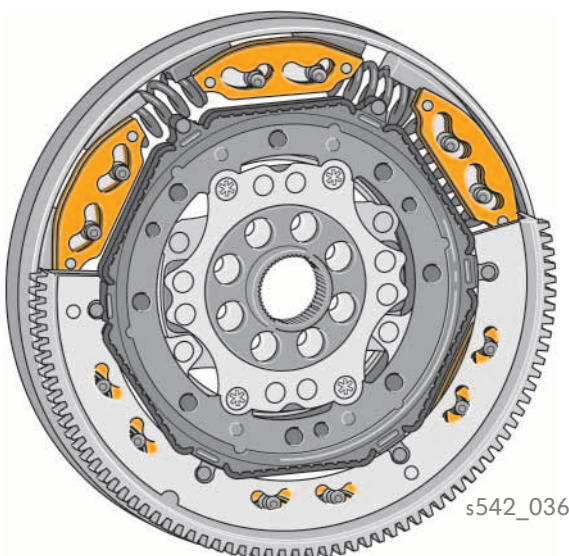


The dual-mass flywheel from LuK is used in conjunction with the 6-speed manual gearbox 02Q and the 2.0 l 110 kW TDI engine or the 2.0 l 140 kW TDI engine.

The maximum torque is 400 Nm.

The four centrifugal pendulum absorbers are float-mounted directly on the flange. They are not visible from the outside.

The dual-mass flywheel from ZK



The dual-mass flywheel from ZF is used in conjunction with the 7-speed dual clutch gearbox 0DL and the 2.0 l 176 kW TDI biturbo engine.

The maximum torque is 500 Nm.

The six centrifugal pendulums are float-mounted between the flange and the secondary mass. They are visible from the outside.



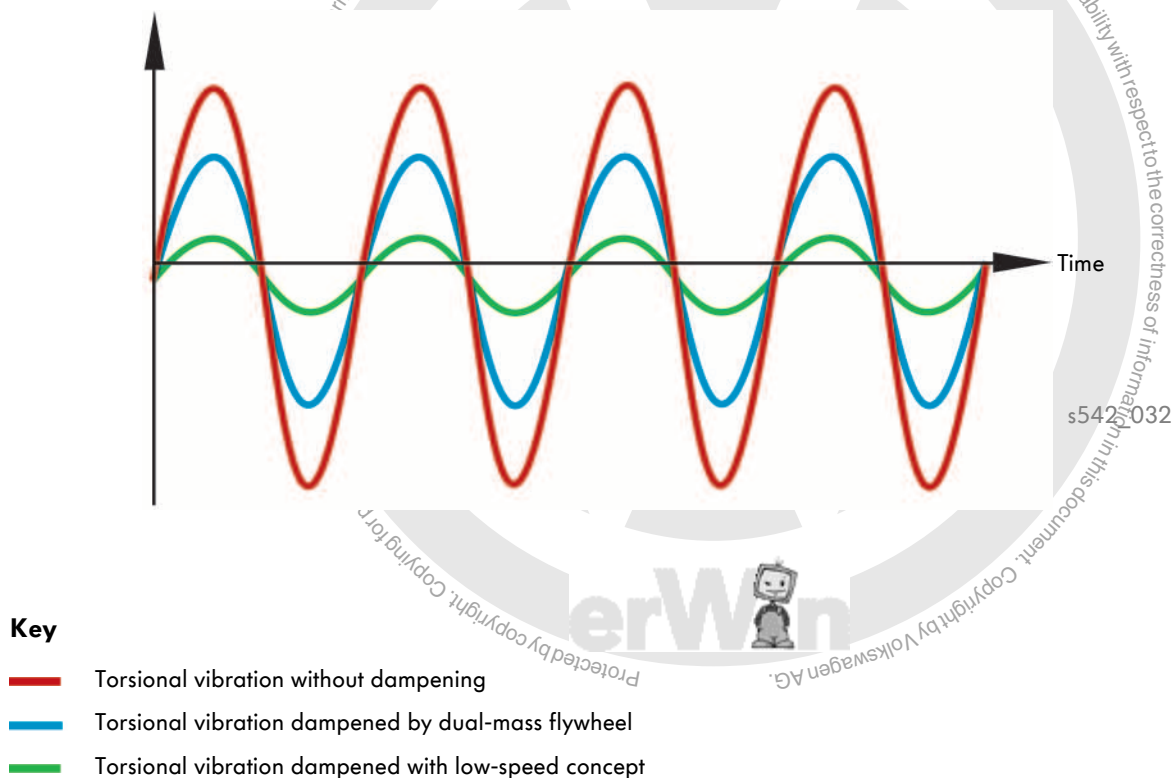
Low-speed concept (LSC)

The low-speed concept (LSC) is a software solution installed in the gearbox control unit that minimises torsional vibrations. This concept is being used for the first time with the 6-speed dual clutch gearbox OD9.

The gearbox control unit can alter the slip of the dual clutch specifically when the car is driven in low speed ranges with a high level of torsional vibrations. This allows the gearbox to shift up earlier so you can make use of engine speeds that consume less fuel.

The high torsional vibrations (red) are damped by a dual-mass flywheel without centrifugal pendulum absorber (blue). The gearbox control unit does not positively engage the wet dual clutch. Slight slip is enabled. The vibrations are minimised by the clutch slippage (green).

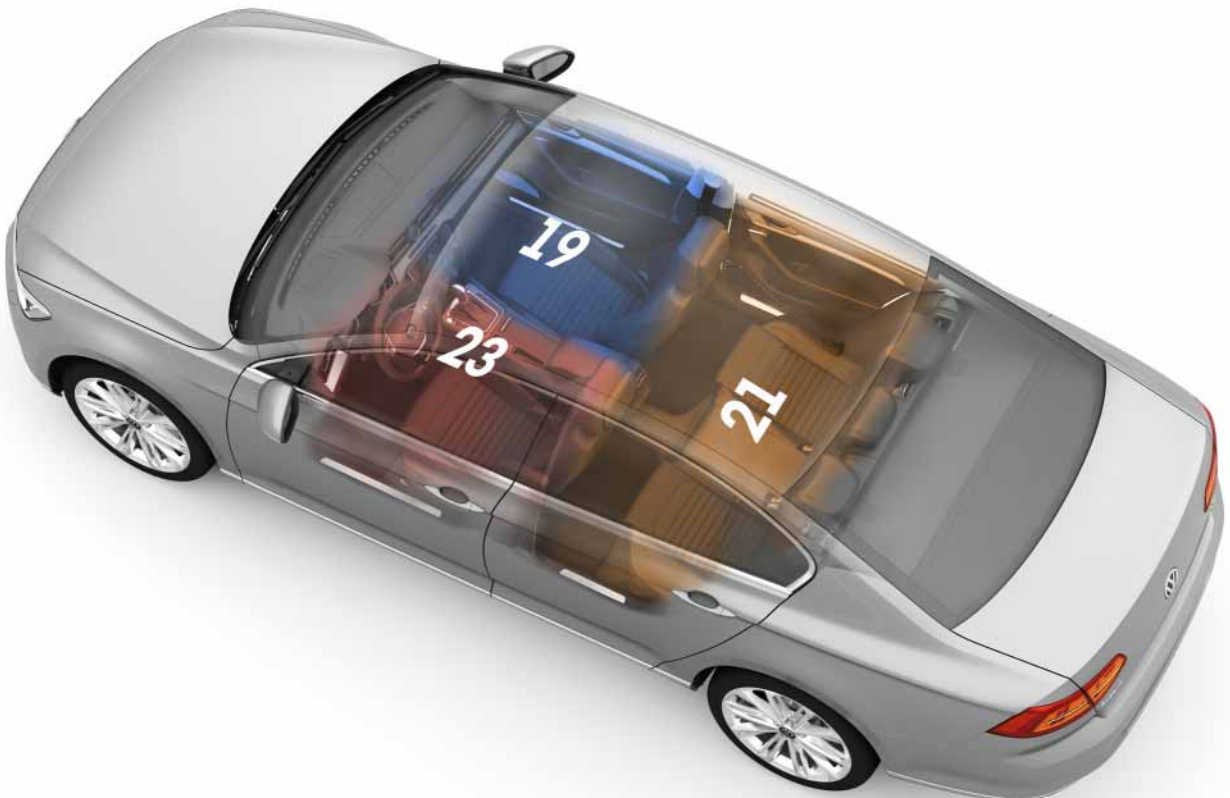
Torsional vibration



3-zone Climatronic

The air-conditioning components featured in the Passat 2015 have been further developed for the modular transverse matrix. An unregulated, single-zone air-conditioning system with manual temperature adjustment and electrical temperature flap adjustment is offered as basic equipment. It appeared in the Golf model year 2013 and has been adapted for the Passat. A Climatronic system with air conditioning for the rear passengers is available for the first time in the Passat.

The 3-zone Climatronic system allows the driver and front passenger as well as the rear passengers to independently set their own preferred comfort temperature. The temperature is then regulated completely automatically.



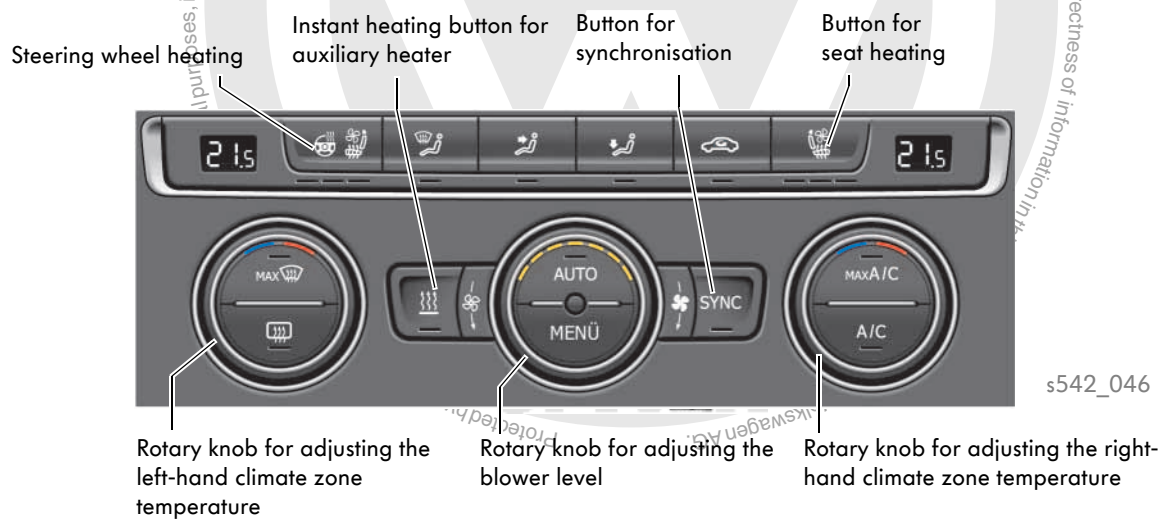
s542_038



Heating and air conditioning

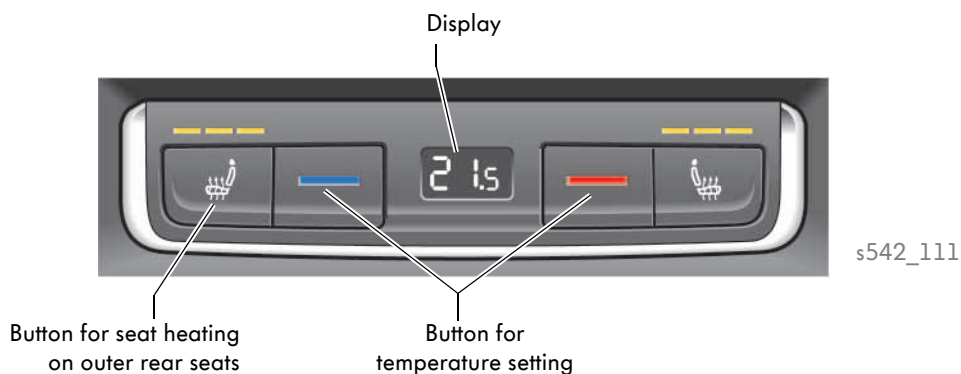
Front operating and display unit

You can select all Climatronic functions on the front operating and display unit. The illustration shows the highest-level version of the Climatronic control operating unit. If you press the "SYNC" button on the front operating and display unit, the temperature settings of all temperature zones will be synchronised with the setting for the driver's side.



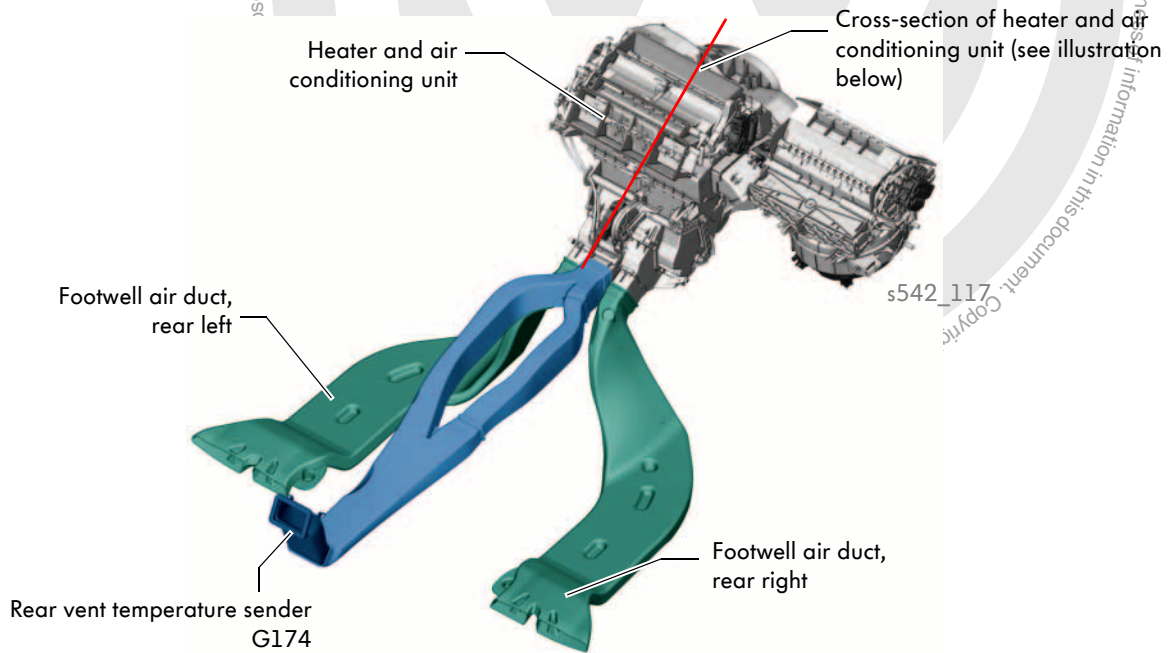
Rear operating and display unit

The rear operating and display unit is located in the centre console below the rear vents. It is connected to the front operating and display unit via the LIN bus. It allows you to adjust all functions for the third climate zone easily from the rear seats. The temperature setting is shown on a display.

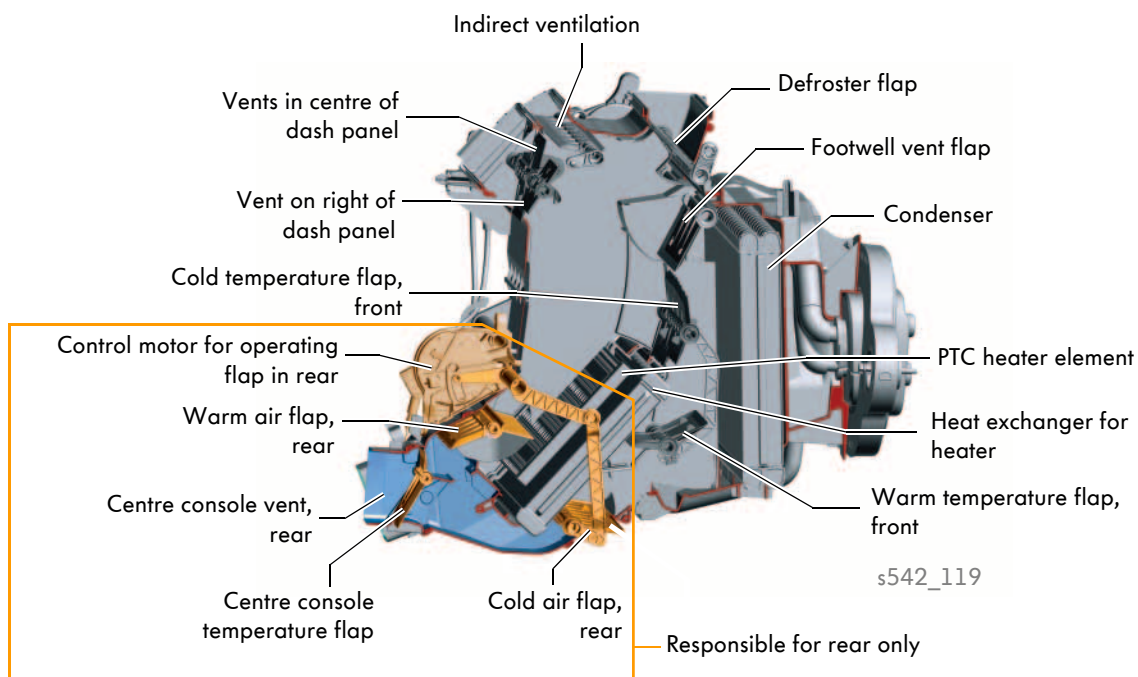


Air distribution in rear

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 in the rear is set on 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 following illustration shows a cross-section through the heater and air conditioning unit.



Running gear

Running gear and driver assistance systems at a glance

The illustration shows you the main features of the running gear and the driver assistance systems for the Passat. The Passat can be equipped with a standard running gear, a sports running gear, a heavy-duty running gear or a DCC running gear.

Running gear:

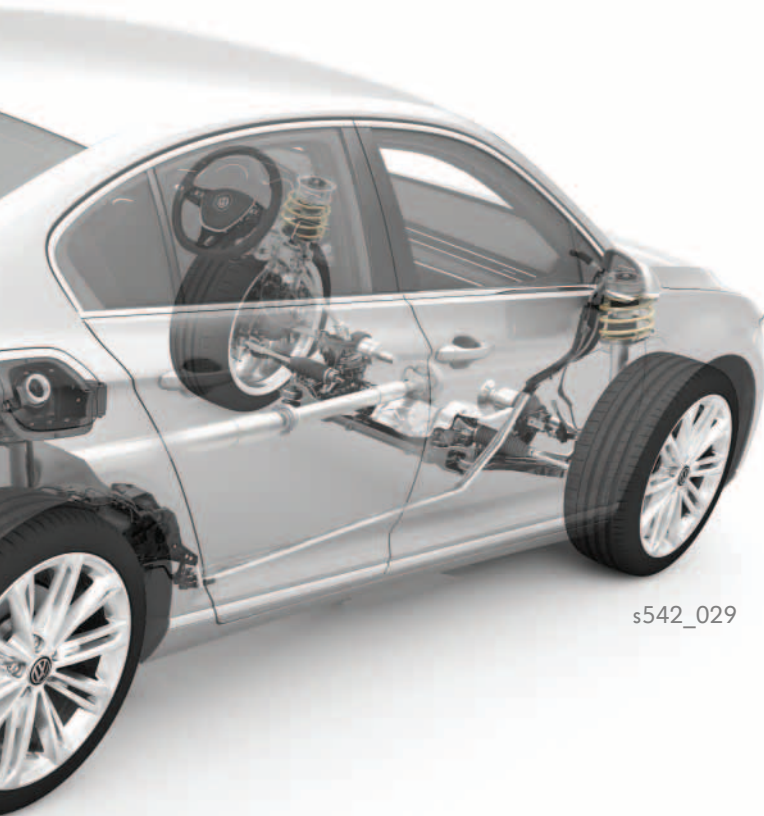
- McPherson strut front suspension
- Four-link rear axle
- Electromechanical parking brake (EPB)
- Electromechanical power steering
 - with parallel-axis drive, standard equipment on left-hand drive models
 - with double pinion from ZF, on right-hand drive models
 - with progressive steering from ZF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



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",
no. 521 "The Golf GTI/GTD 2013" (progressive steering)

uses, in part or in whole, is not permitted un-

not any liability with respect to the correctness of information in this document. Copyright by Volkswagen AG.



s542_029

Driver assistance systems:

- Area monitoring system – **FRONT ASSIST**
 - City Emergency Brake
 - Pedestrian Monitoring
- 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 – **REAR TRAFFIC ALERT**
- Parking steering assistance – **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
- **DRIVER ALERT SYSTEM**



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

Electrical system

Locations of electrical components

Depending on the equipment level, an alternator with an output of either 140A or 180A and the following battery types are used in the Passat 2015:

- Lead-acid battery
- EFB (Enhanced Flooded Battery)
- AGM (Absorbent Glass Matt)

Also depending on the equipment and power unit, the 12V battery can be fitted in the engine compartment or in the luggage compartment.

12V battery in engine compartment

Three fuse holders distribute the current in the vehicle:

- A multifuse pre-fuse holder SA in the engine compartment electronics box
- A relay and fuse holder SB in the electronics box
- A relay and fuse holder SC at the bottom left of the passenger compartment, behind the storage compartment

12V battery in luggage compartment

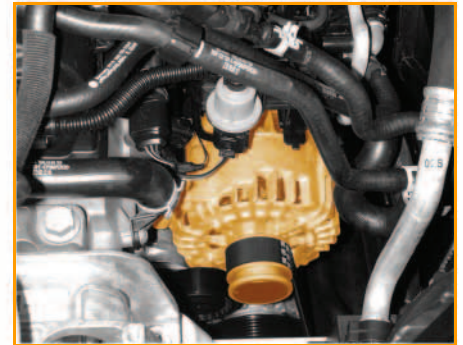
The battery is fitted in the luggage compartment on the left behind a trim panel.

Four fuse holders there distribute the current in the vehicle:

- A multifuse pre-fuse holder SA in the engine compartment electronics box
- A relay and fuse holder SB in the electronics box
- A relay and fuse holder SC at the bottom left of the passenger compartment, behind the storage compartment
- Fuse holder SD in the main fuse box

The electrical supply to the high-current consumers in the engine compartment is disconnected by the battery isolator switch J990 and by the airbag system when an airbag is deployed. Only the ABS control unit J104 and power steering control unit J500 are still supplied with current. As a result, the vehicle's steering and brake functions are still ensured.

Alternator



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



Multifuse pre-fuse holder SA



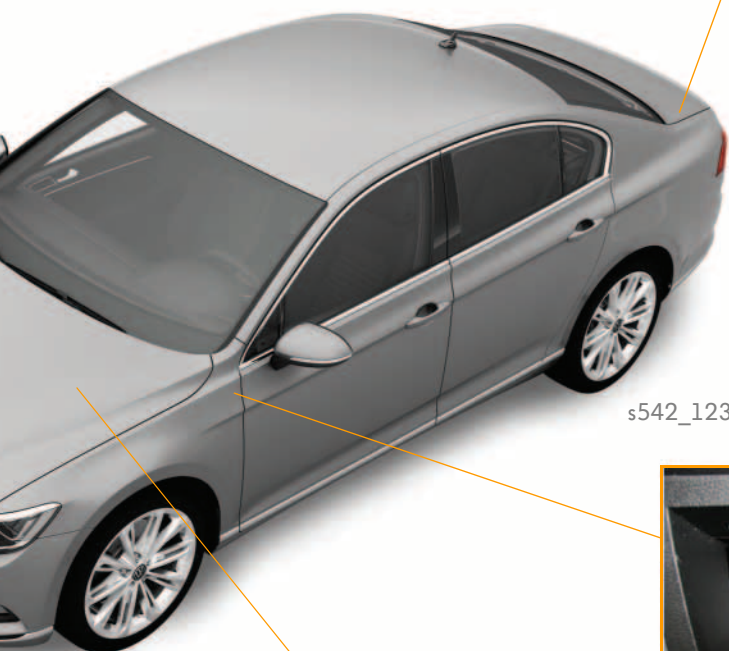
12 V battery in luggage compartment with main fuse box
There is no 12 V battery in the engine compartment when the 12 V battery is fitted in the luggage compartment.

...with respect to the correctness of information in



Main fuse box with fuse holder SD, positive battery terminal clamp and battery isolator switch J990

s542_123



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



12V battery in engine compartment
There is no 12 V battery in the luggage compartment when the 12 V battery is fitted in the engine compartment.



You will find further information on the whole "Electrical system" chapter in Self-study Programme no. 545 "The Passat 2015 – Electrical System".



Electrical system

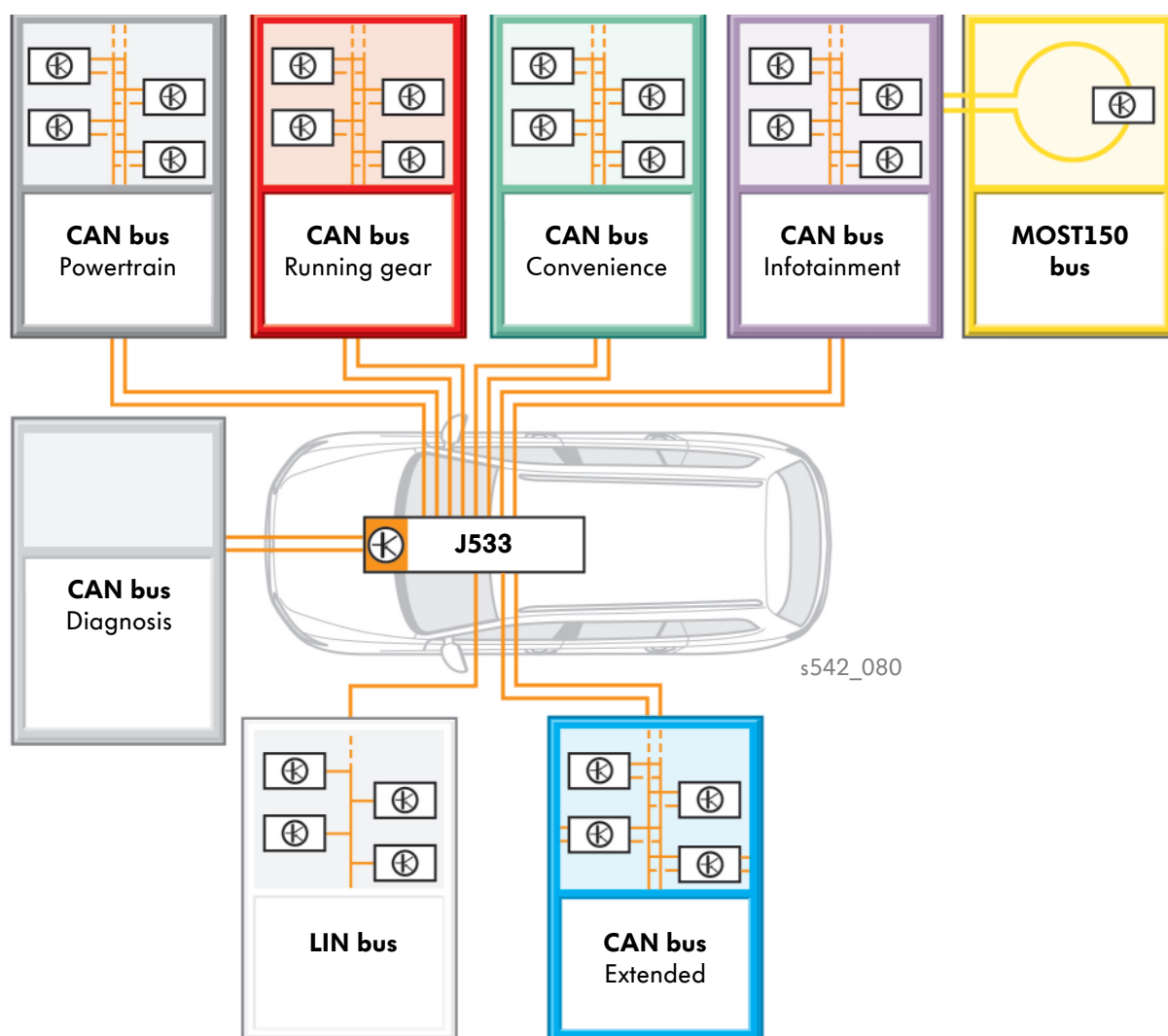
Network design

The vehicle electrical system is based on the MQB and has been extended for the Passat 2015 (MQB-B).

All CAN bus systems in the Passat 2015 have a transfer speed of 500 kbit/s.

The LIN buses have a speed of 19.2 kbit/s. The MOST150 bus using fibre-optic technology with a transfer speed of 150 Mbit/s is new to the Passat.

The data bus diagnostic interface J533 contains the control system for several LIN buses and forms the link between the individual CAN bus systems as usual. Further LIN buses are connected to various control units.



Key

- J533 Data bus diagnostic interface
- == CAN bus wire
- LIN bus wire

Lighting system

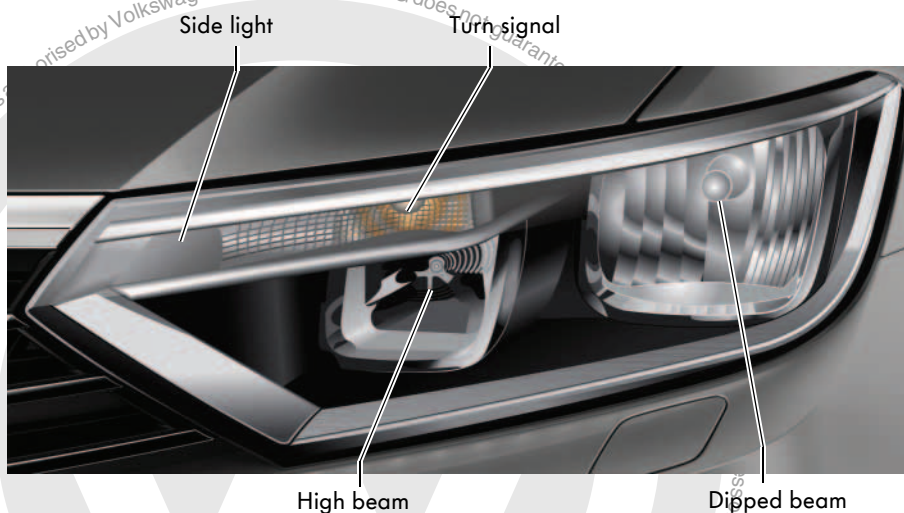
Front lights

Three types of headlight are available for the Passat 2015:

- Halogen headlights with conventional long-life bulbs
- “Basic” LED headlights using reflector technology
- “High” LED highlights using projection technology with **DYNAMIC LIGHT ASSIST** and dynamic cornering lights (AFS)

Halogen headlights

The halogen headlights feature the four light functions: dipped beam, main beam, side light and turn signal.



s542_081

Additional light module



s542_087

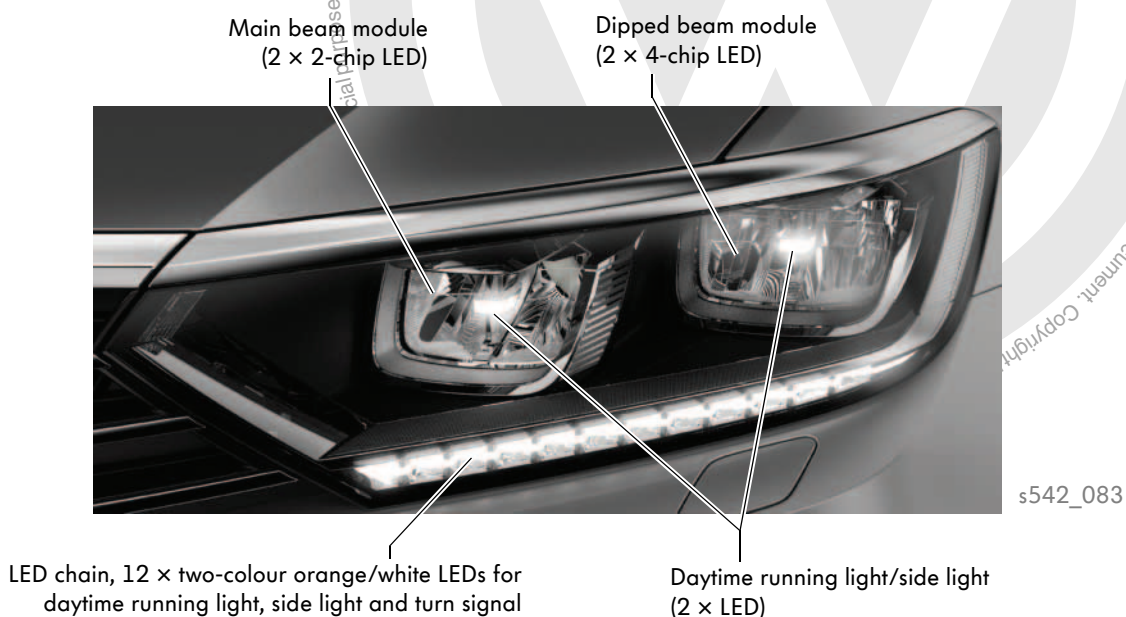
If the vehicle is equipped with halogen headlights, the daytime running light is located in the additional light module lower down in the bumper. The front fog light with static cornering light function is also optional in this additional light module.



Electrical system

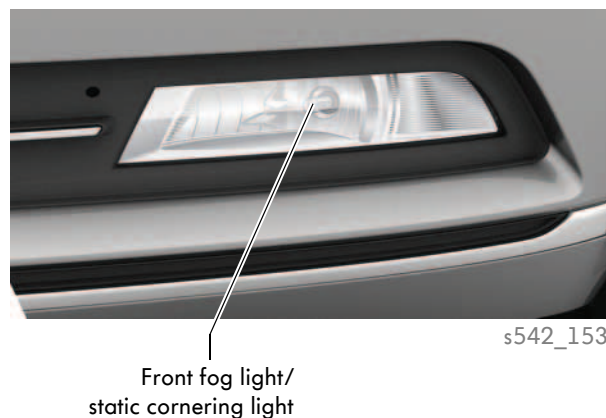
“Basic” LED headlights

The “Basic” LED headlights have an LED chain with two-colour LEDs that are used for the daytime running lights/ side lights and the turn signal. The LED chain is illuminated white for the daytime running and side lights. It is illuminated orange for the turn signal. In addition, two LEDs are fitted for the daytime running and side lights. The light from the LED chain and the two additional LEDs is dimmed for the side light function.



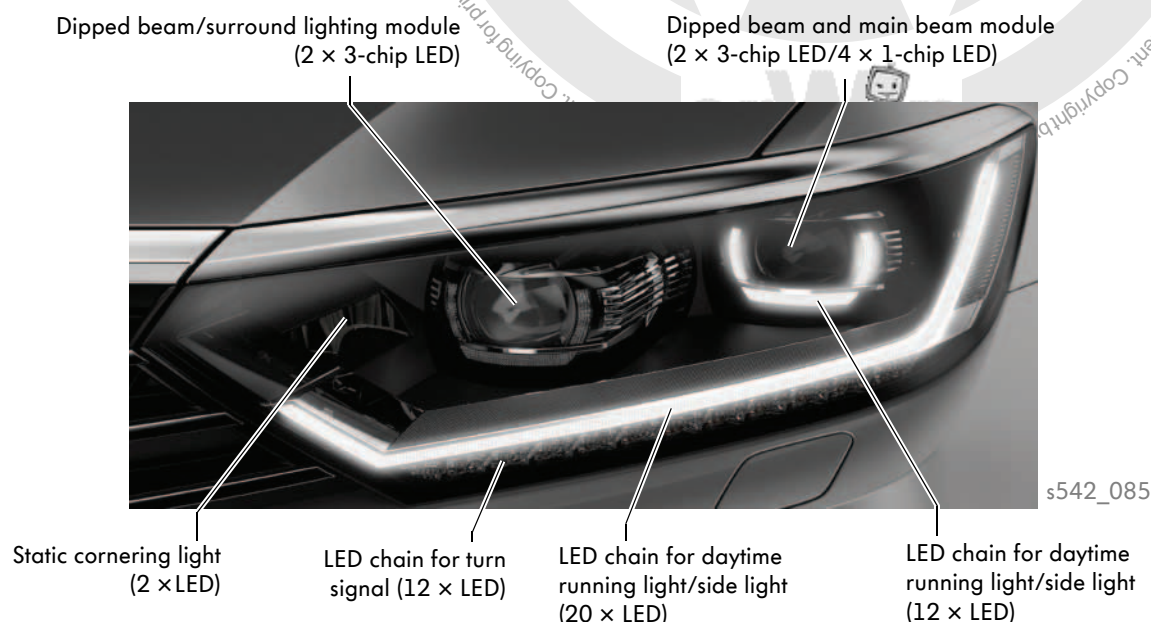
Additional light module

When the “Basic” LED headlight is fitted, the front fog light in the additional light module also serves as the “static cornering light”.



“High” LED headlights

The “High” LED headlights feature the “DYNAMIC LIGHT ASSIST” and “dynamic cornering light (AFS)” functions. This is an all-LED headlight using projection technology with separate LED chains for the daytime running/side light and turn signal. The dipped beam and main beam module is ringed by an additional LED chain for the daytime running light/side light. The whole daytime running light is dimmed for the side light function. An additional dipped beam module for surround lighting is accommodated next to the dipped beam and main beam module. The cornering light is integrated into the headlight as a separate light.



Additional light module



Front fog light

The front fog light is installed in the additional light module when the vehicle is equipped with “High” LED headlights.

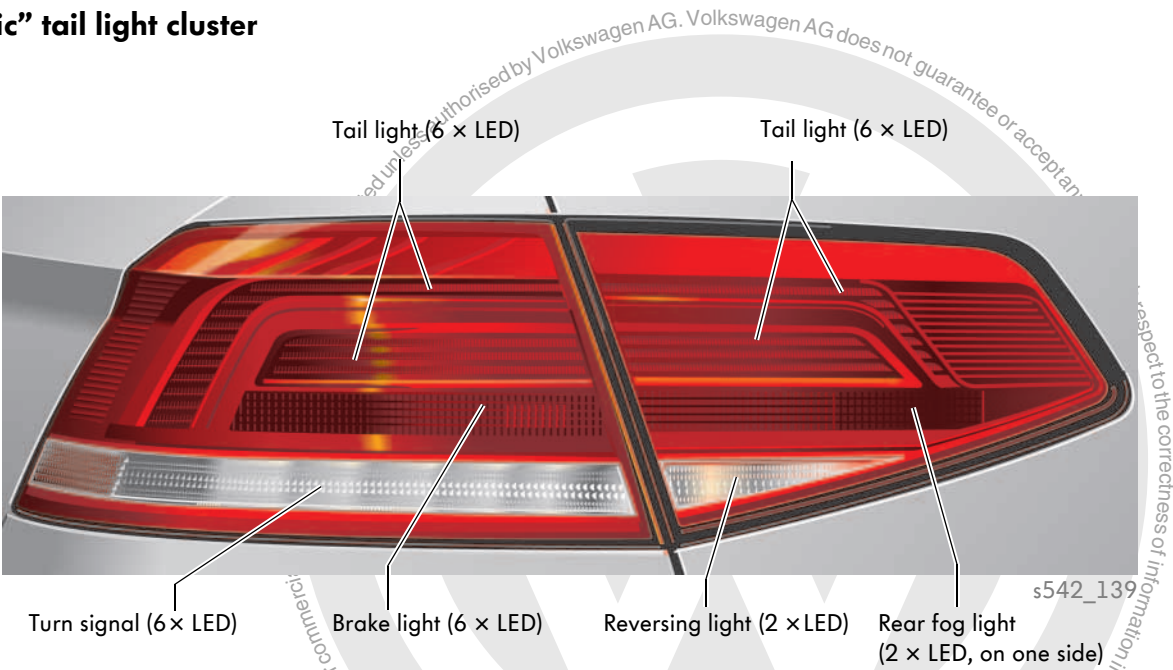


Electrical system

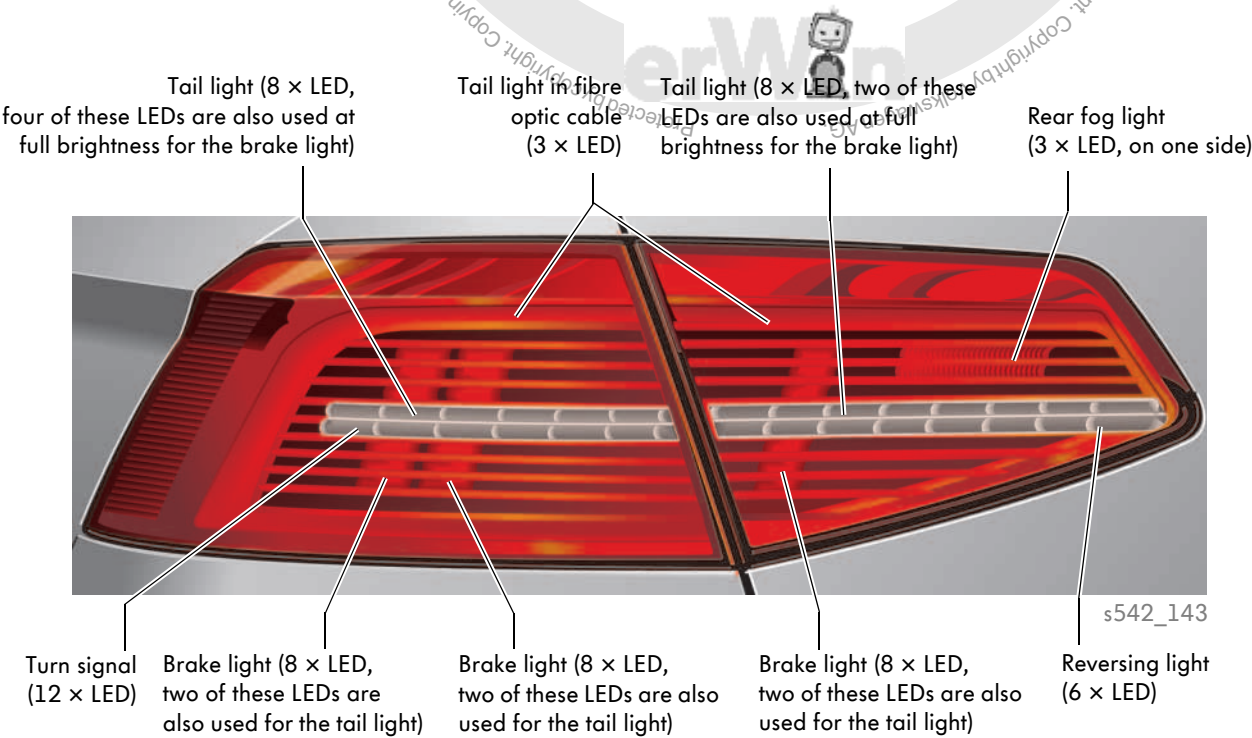
Rear lights

The rear lights installed in the Passat 2015 use exclusively LED technology for the first time. Two types are available: Basic and High. The tail lights on both types are split between a fixed section and a section on the rear lid.

“Basic” tail light cluster



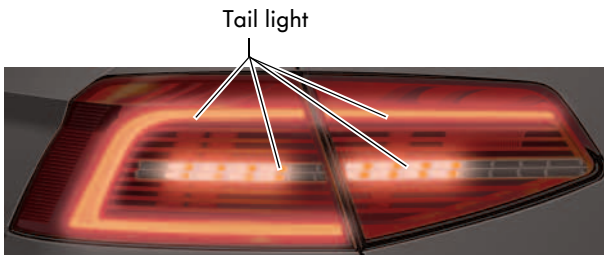
“High” tail light cluster



“High” version light functions

Some LEDs and LED segments are used for different light functions on this version.

Light pattern: tail light

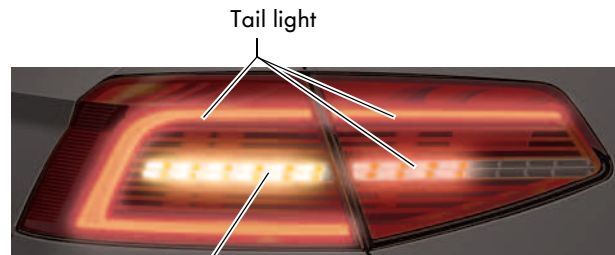


s542_145

The following segments are illuminated for the tail light:

- Fibre optic cable in the fixed section and rear lid section (3 × LED)
- Row in fixed section (8 × LED)
- Row in rear lid section (8 × LED)

Light pattern: tail light with turn signal



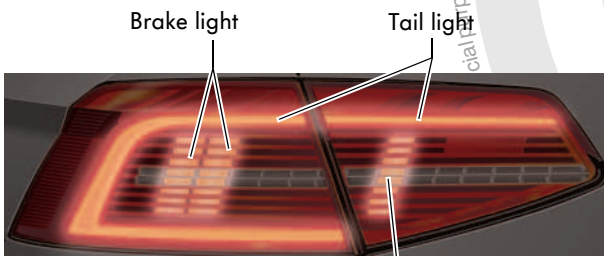
s542_147

If you switch on the turn signal while the tail lights are on, the following segments of the tail light will remain illuminated:

- Fibre optic cable in the fixed section and rear lid section (3 × LED)
- Row in rear lid section (8 × LED)

The row in the fixed section with the 12 turn signal LEDs is now illuminated for the turn signal.

Light pattern: tail light with brake light



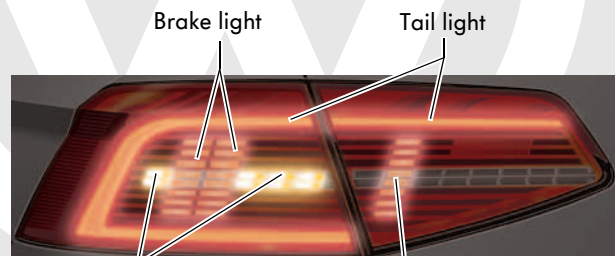
s542_149

For the tail light, the fibre optic cable in the fixed section and in the rear lid section (3 × LED) is illuminated.

The following segments are illuminated for the brake light:

- two segments in the fixed section (16 × LED, four of these are also used for the tail light, but are at full brightness for the brake light)
- one segment in the rear lid section (8 × LED, two of these are also used for the tail light, but are at full brightness for the brake light)

Light pattern: tail light with brake light and turn signal



Turn signal 2 × LED and 6 × LED s542_151

The segments are illuminated the same as for “Light pattern: tail light with brake light” in this case. Only the two rows in the fixed section with 2 × LED and 6 × LED are illuminated for the turn signal.

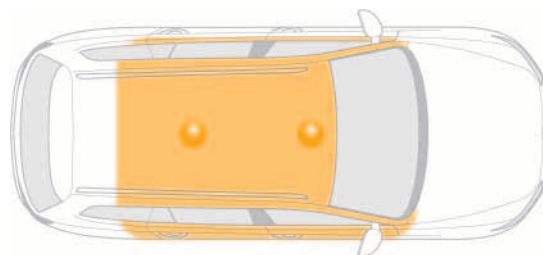


Keyless access systems

Two keyless access systems are available for the Passat 2015: “Press and Drive” and “Keyless Access”. The standard keyless access system is “Press and Drive”. The Passat 2015 therefore does not have a conventional ignition lock.

“Press and Drive”

The convenience system in the Passat 2015 has two interior aerials. These aerials detect whether an authorised vehicle key is located in the vehicle. You switch on the ignition and start the engine using the starter button E378. The vehicle needs to be unlocked beforehand via the remote control.



s542_040

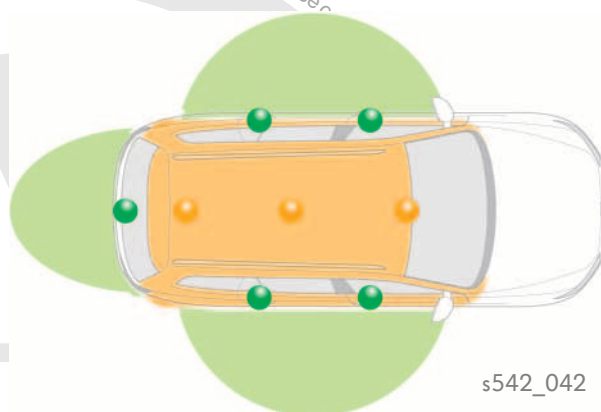
Key

● Interior aerial

“Keyless Access”

The optional “Keyless Access” system also allows you to lock and unlock the vehicle without a key. The Passat has one additional interior aerial and five external aerials for this system.

The rear aerial is used for the Easy Open system.



s542_042

Key

● Interior aerial

● External aerial

Start/stop system

The Passat uses the second generation start/stop system.



s542_141

The start/stop system 2.0 has the following main features:

- Extended display possibilities (e.g. reason for stop refusal)
- Intermittent mode (multiple stop and restart operations on request when the vehicle is stationary)
- The engine can enter stop mode in the following situations:
 - Adaptive cruise control (ACC) is activated
 - Auto Hold is activated
 - The electromechanical parking brake (EPB) is activated
 - A trailer is attached
 - During stopping procedure (before the vehicle comes to a stop)



Electrical system

Instrument cluster

Three types of instrument cluster are available for the Passat 2015:

Medium instrument cluster



Functions and characteristics

- Black and white TFT centre display with a resolution of 320 × 240 pixels
- Analogue gauges for rev counter, speed, coolant temperature and fuel
- Multifunction display showing the following information:
 - Time, total mileage, trip mileage
 - Vehicle warning messages in form of symbols and text in 24 languages
 - Selected range, gear change display
 - Onboard computer with efficiency display
 - Outside temperature, ice warning
 - Cruise control system display
 - Speed limiter display
 - Speed warning
 - Date
 - Loudspeaker for acoustic warnings
 - Service interval
 - Engine code
 - Additional driver assist systems
 - Navigation guidance
 - Telephone lists
 - Radio station lists
 - Oil temperature display

Colour instrument cluster



Functions and characteristics

The same functions as the Medium version plus:

- Colour TFT centre display (256 colours or grey shades can be displayed)
- Screen transitions with animations

AID “Active Info Display” instrument cluster



On the new Active Info Display, the analogue gauges are depicted digitally for the first time and are shown on the complete display.

Safety-related indicator lamps are still in the form of fixed symbols positioned above the display:

- Turn signals
- Warning lamp for exhaust-related faults
- Glow period warning lamp for diesel engine
- ABS warning lamp
- Central warning lamp (observe displayed message)
- Warning lamp for faults in the electromechanical power steering
- Warning lamp for faults in the brake system
- Warning lamp for electromechanical parking brake

The driver information display can be customised to show additional data for the driving, navigation and driver assistance functions in the centre of the speedometer and of the rev counter.

Functions and characteristics

- 12.3" TFT complete display with a resolution of 1440 × 540 pixels
- Features all basic functions
- Different displays can be selected
- Automatically changing displays depending on the active function
- Display of 2D and 3D graphics
- Navigation and media display



Modular infotainment matrix (MIB)

The Passat 2015 features the second generation of the modular infotainment matrix (MIB).
The Discover Pro Generation 2 is available for the first time in the new Passat.



Function overview	Composition Touch	Composition Colour	Composition Media
Design/display	5" B&W	5" colour	6.5" colour
Touchscreen	●	●	●
Radio AM/FM	●	●	●
RDS/station logos	●	●	●/-
Phase diversity	-	●	●
CD drive	-	●	●
DVD drive	-	-	-
HDD/SSD	-	-	-
MP3-compatible	●	●	●
SD card slot	●	●	●
AUX-IN interface	●	●	●
USB/iPod interface	-	-	●/○
Tone adjustment	Three-way	Three-way	Five-way
Output control	2 × 20 watts	4 × 20 watts	4 × 20 watts
Voice control	-	-	○
BLUETOOTH telephony	-	-	●
Front loudspeakers	●	-	-
Front/rear loudspeakers	-	●	●
2D/3D map display	-	-	-
Compatible with reversing camera	-	-	○
UMPP pairing box	-	-	○
Premium RSAP TELEPHONY including Wi-Fi	-	-	-
Sound system	-	-	○
DAB+	-	-	○



You will find further information on the whole “Infotainment” chapter in self-study programmes no. 546 “The Passat 2015 – Infotainment and Car-Net”, no. 533 “The Polo 2015”, no. 518 “The Infotainment System in the Golf 2013 – Part I” and no. 519 “The Infotainment System in the Golf 2013 Part II”.



Function overview	Discover Media	Discover Pro
Design/display	6.5" colour	8" colour
Touchscreen	●	●
Radio AM/FM	●	●
RDS/station logos	●/-	●/-
Phase diversity	●	●
CD drive	●	-
DVD drive	-	●
HDD/SSD	-	64 GB SSD
MP3-compatible	●	●
SD card slot	●	●
AUX-IN interface	●	●
USB/iPod interface	●/○	●/○
Tone adjustment	Five-way	Five-way
Output control	4 x 20 watts	4 x 20 watts
Voice control	○	●
BLUETOOTH telephony	●	●
Front loudspeakers	-	-
Front/rear loudspeakers	●	●
2D/3D map display	●	●
Compatible with reversing camera	○	○
UMPP pairing box	○	○
Premium RSAP TELEPHONY including Wi-Fi	-	○
Sound system	○	○
DAB+	○	○

● Standard

○ Optional

- Not available



Interfaces (connectivity)

The Passat offers numerous connection possibilities for customers:

- CD/DVD drive
- Up to two **SD CARDS**
- Media interfaces:
 - AUX-IN socket
 - Up to two data-compatible USB connections with Apple support
- Mobile telephone interface with:
 - **BLUETOOTH** protocols HFP, PBAP, A2DP, AVRCP, MAP, rSAP
 - Wi-Fi connection: client, HOTSPOT or CarStick
 - Comfort mobile telephone interface: improves reception with an external aerial
 - Premium mobile telephone interface: integrated **SIM CARD** reader

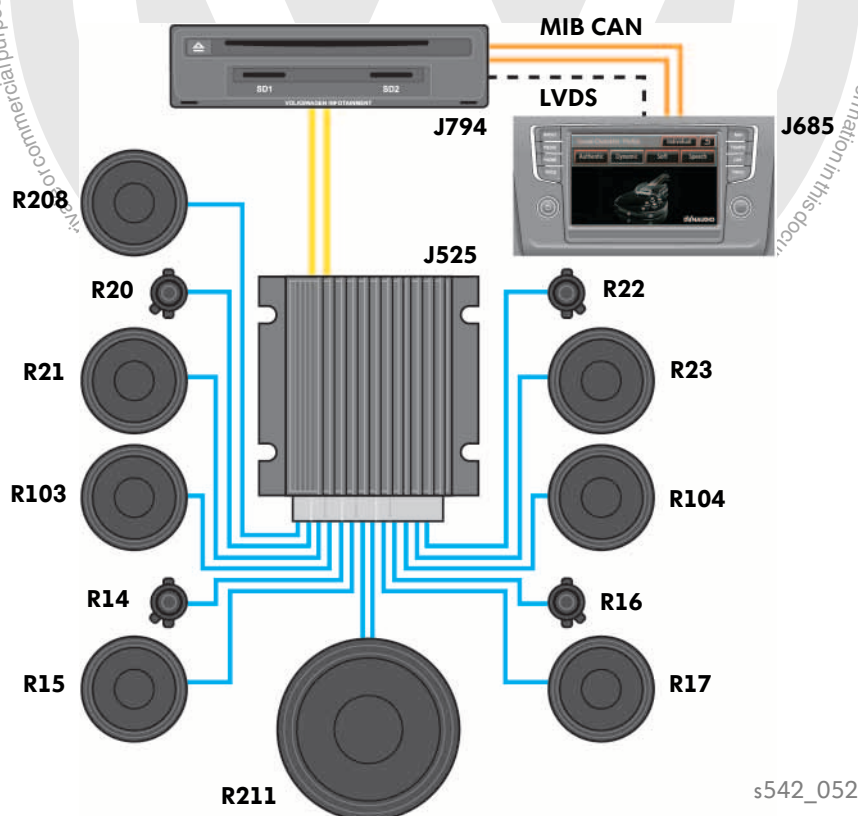
Connection possibilities to the infotainment systems



s542_115

“Dynaudio Confidence” sound system

The centrepiece of the optional “Dynaudio Confidence” sound system is a 16-channel amplifier delivering 700 watts and featuring MOST technology. It is connected to 11 loudspeakers and a 10.5-litre SUBWOOFER that is fitted in the spare wheel well. Therefore a total of 13 of the amplifier’s 16 channels are currently used.



s542_052

Key

R14	Rear left treble loudspeaker	R104	Front right mid-range loudspeaker
R15	Rear left bass loudspeaker	R208	Centre loudspeaker
R16	Rear right treble loudspeaker	R211	Subwoofer
R17	Rear right bass loudspeaker	J525	Digital sound package control unit
R20	Front left treble loudspeaker	J685	Display unit for front information display and operating unit control unit
R21	Front left bass loudspeaker	J794	Control unit 1 for information electronics
R22	Front right treble loudspeaker		MOST fibre optic cable
R23	Front right bass loudspeaker		CAN bus wire
R103	Front left mid-range loudspeaker		Loudspeaker output wire
			LVDS high-speed cable for transferring picture and control information



Car-Net services in the Passat

The range of Car-Net services has been expanded with the Passat 2015. Now up to 12 Car-Net services are available to customers depending on the vehicle equipment level:

- Google Earth
- Google Street View
- Online Traffic Information
- Online POI Search
- POI Voice Search
- Weather
- News
- Fuel Info
- Parking Info
- Vehicle Health Report
- Personal POI
- Destination Import

MirrorLink

The MirrorLink standard is now also available for the Passat. It is therefore possible to mirror your smartphone display on the radio-navigation system screen. Volkswagen has developed a number of apps for this standard that can also be used while you drive. They are:

- My Guide
- Drive & Track
- Think Blue. Trainer.
- Shared Audio
- Call & Remind
- Sound Journey

Customer portal

Customers need to register on the Car-Net customer portal and assign the vehicle to their customer account before they can use the Car-Net services. The portal can be found at: **www.volkswagen-carnet.com**

The „Destination Import”, „News”, „Personal POI” and „Vehicle Health Report” services are controlled via the customer portal.



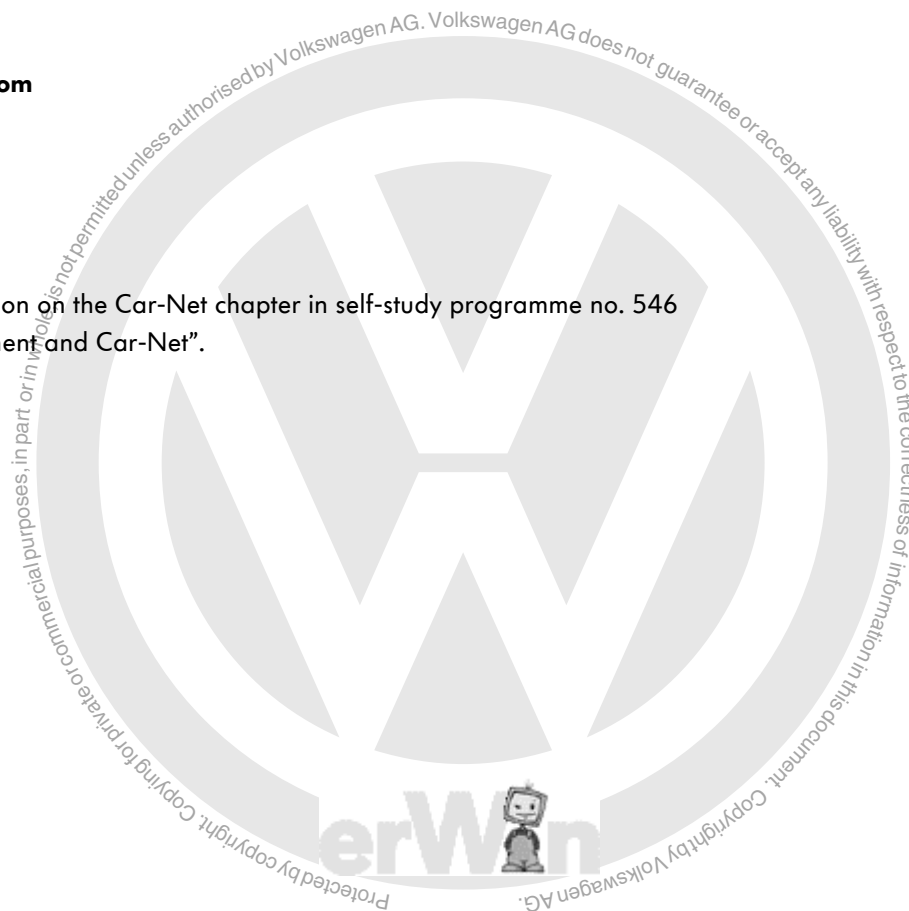
Service portlet

Upon launch of the Passat 2015, the service portlet will provide dealers with a diagnosis tool for Car-Net. Contract data, vehicle data, service availability and possible back-end failures can be checked there quickly. The service portlet can be found on Volkswagen's integration portal. It can be accessed via the following Internet addresses:

- <https://iportal-de.volkswagenag.com>
- <https://iportal-de.cpn.vwg>



You will find further information on the Car-Net chapter in self-study programme no. 546 „The Passat 2015 – Infotainment and Car-Net”.



Glossary

ABS

(Anti-lock braking system)

Traction control system that stops the wheels locking during braking.

ACC

Abbreviation for adaptive cruise control.

AFS

(Advanced Frontlighting System)

Abbreviation for cornering light CAN bus. This function improves illumination of the road considerably when the vehicle is cornering as the headlight light cone is directed according to the position of the steering wheel.

AGM

(Absorbent Glass Mat)

Abbreviation for a type of battery in which the electrolyte is held in micro-glass fibre mats.

AM

Amplitude modulation, electromagnetic wave used to transmit messages.

In amplitude modulation, the amplitude of the high frequency is varied.

Area View

Area View is a camera-based surround monitoring system that allows the driver to see the complete area around the vehicle. It offers drivers a variety of views and configurations that can be specifically selected according to the traffic situation and the information they require.

AUX-IN

Signal input for external audio devices.

AVRCP

(Audio Video Remote Control Profile)

Bluetooth profile for remote control of audio and video devices.

A2DP

(Advanced Audio Distribution Profile)

A cross-manufacturer technology that permits wireless transmission of stereo and audio signals via Bluetooth to a corresponding receiver.

Bluetooth

Bluetooth is an industry standard developed by the Bluetooth Special Interest Group (SIG) for wireless communications between devices over short distances.

CAN

(Controller Area Network)

Standardised digital two-wire data network used in vehicle electronics.

DAB

(Digital Audio Broadcasting)

Digital radio broadcasting from radio stations.

DAB+ is a further development of digital radio, which was introduced in 2011 in Germany.

Dynamic Light Assist

A driver assist system that controls the beam pattern of the headlights, for example, to avoid dazzling oncoming traffic when driving with main beam headlights.

DVD

Digital Versatile/Video Disc

A further development of optical storage media with a memory capacity of 4.7 GB, on one-sided, single-layer DVDs (single-layer DVD, DVD±R, DVD±RW), and 8.5 GB, on one-sided, double-layer DVDs (dual-/double-layer, DVD±R-DL, DVD-RW±DL).



EFB

(Enhanced Flooded Battery)

Abbreviation for an improved type of wet battery.

Emergency Assist

Emergency Assist is a further development of the Lane Assist system. If the driver becomes incapable of driving, this system takes over control of the vehicle, warns other road users and brakes the vehicle to a stop.

ESC

(Electronic Stabilisation Control)

Electronic stabilisation program; previously abbreviated to ESP.

FM

Frequency modulation, electromagnetic wave used to transmit messages.

In frequency modulation, the frequency of the carrier wave varies in step with the information signal. The amplitude remains constant.

Front Assist

Electronic area monitoring system that monitors the distance from the vehicle in front, issues a warning if there is a risk of a collision and automatically brakes the vehicle.

HFP

(Hands Free Profile)

Bluetooth standard for hands-free systems.

Hotspot

The term hotspot is often used to describe a public Internet access point. You can connect to the Internet wirelessly via a hotspot.

Lane Assist

(Lane departure warning)

Electronic driver assist system that informs the driver if the vehicle is departing from a lane and corrects minor deviations within the scope of the system limits.

LED

(Light Emitting Diode)

Energy-saving light system in which one or more light-emitting diodes are combined to form a single source of light.

LIN

(Local Interconnect Network)

Serial, single-wire data network that is used to connect electronic components to higher-level control units.

MOST

(Media Oriented Systems Transport)

This is a serial bus system for transmitting audio, video, speech and data signals. Volkswagen currently uses fibre optic cable for this bus system.

MIB

(Modular infotainment matrix)

Name for a modular system of infotainment components used by Volkswagen Group brands for their models.

MP3

Abbreviation for MPEG Layer3 (Motion Picture Experts Group Layer 3); compression standard for audio data formats.

Driver Alert System

Electronic driver assist system that detects when the driver starts to lose concentration.



Glossary

MQB

(Modular transverse matrix)

Designation for a modular system used by Volkswagen Group brands in vehicle development and production.

Park Assist

(Parking steering assistance)

Driver assist system that actively supports the driver when parking or exiting a parking space depending on the system version.

RDS

(Radio Data System)

A standardised system for transmitting additional radio information such as the station name, song title etc.

TPLI

(Tyre Pressure Loss Indicator)

Driver assist system that alerts the driver if the tyre pressure at any of the four wheels deviates from the set target pressures.

rSAP telephony

(remote SIM Access Profile)

Profile that allows the SIM card to be read and your access data to be used by the universal mobile telephone preparation (UMPP).

SD card

(Secure Digital card)

Small and robust memory cards, e.g. for digital cameras.

Side Assist

(Lane change assist)

Driver assist system that supports the driver when overtaking and changing lanes.

SIM card

(Subscriber Identity Module card)

A SIM card is a chip card with a built-in processor that can be inserted into a mobile telephone, for example. It can be used by a mobile telephone user to log into a telecommunication network.

SSD

(Solid State Drive)

Storage medium without moving mechanical parts.

Traffic Jam Assist

When equipped with Traffic Jam Assist, your vehicle can react to the vehicle in front in congestion. The vehicle brakes, accelerates and steers semi-automatically and thus increases driving comfort in stop-and-go traffic.

Subwoofer

(Term for bass loudspeaker)

Subwoofers are special loudspeakers that reproduce very low-frequency bass sounds. A distinction is made between active and passive subwoofers. Active subwoofers have their own power amplifiers; passive subwoofers do not have their own power amplifiers and are connected to an amplifier output like a normal loudspeaker.

TFT

(Thin Film Transistor)

Abbreviation for a flat screen with a transistor display matrix.



Top tether system

The top tether system is used for additional child seat anchoring on the rear seat bench.

Traffic Alert

When reversing out of a perpendicular parking space, this system warns the driver about moving objects in the area behind the vehicle.

Trailer Assist

This trailer manoeuvring system simplifies reversing manoeuvres with a trailer. The system takes over steering once you enter the direction and the turning angle. The vehicle and the trailer are steered precisely while the driver only has to operate the accelerator and brakes.



USB

(Universal Serial Bus)

A standardised interface between various electronic devices such as computers, printers, scanners, televisions etc.









© VOLKSWAGEN AG, Wolfsburg
All rights reserved. Subject to technical modifications.
000.2812.99.20 Technical status 11/2014

Volkswagen AG
After Sales Qualification
Service Training VSQ-2
Brieffach 1995
D-38436 Wolfsburg

♻️ This paper was manufactured from pulp that was bleached without the use of chlorine.