Service Training

Commercial Vehicles

Self-study programme 561

The T6 2016

Benchmark in its class

Pioneer in the segment for more than 60 years

The totality of all the product characteristics ascribed to the Volkswagen Transporter has made it the epitome of its vehicle class, and sets the yardstick in its segment. On this basis, the Transporter achieves a unique level: It represents the optimum assistant and partner for commercial and private customers, assisting them in their everyday life and in their leisure time in the best possible way. The success story of the Volkswagen Transporter is manifested in its ongoing and clear segment leadership.

With the 6th model release of the Transporter, Volkswagen Commercial Vehicles is laying the best foundations for retaining and expanding the segment leadership in Germany and Europe.

A central feature of the T6 2016 concerns the introduction of modern, particularly efficient EU6 engines. All units are equipped with BlueMotion Technology as standard. Significant consumption and emissions reductions set new best values in the segment. A variety of innovative driver assistance and safety systems also supports the driver and protects the occupants. Highlights include the automatic cruise control (ACC), front scan system (Front Assist), automatic emergency braking (AEB) and dynamic chassis control (DCC). Of course, the new generation is also available with 4 wheel drive again (4MOTION).

Basically, there are 3 main categories of the Transporter series – the commercial vehicles (panel van, platform van, double cab and window van), the people carriers designed for professional and private use (Multivan and Caravelle) as well as the leisure automobiles (California).

Self-Study Programme presents the design and function of new developments!
The content will not be updated.

Current testing, setting and repair instructions can be found in the service literature provided.

Important Note

At a glance








The product characteristics of the T6 2016

The overview lists new and striking product characteristics of the T6 2016. Deviations are possible depending on the country.

- Headlights with LED technology
- Four-wheel drive with 4WD coupling generation V
- Lane changing assist
- High beam assist
- Hill-descent assist
- Heated windscreen

S561_077

- Multicollision brake
- Petrol engines of the EA211 series
- Diesel engines of the EA288 series with SCR system
- Dynamic chassis control (DCC)

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- New generation of radios and navigation systems
- Cruise control system (CCS) with automatic cruise control (ACC)

The recognition features of the T6 2016

Newly designed engine cover, bumper and headlights at front

New wing panel with cut-in, rectangular turn signal repeater

Optimised seat systems and 12-way seats

New dash panels with new multifunction steering wheel

New radios and navigation systems

New tailgate with larger number plate panel, larger window cut-out and spoiler, New tail light clusters, optionally with LED technology and newly designed bumpers

Newly designed door trim panels

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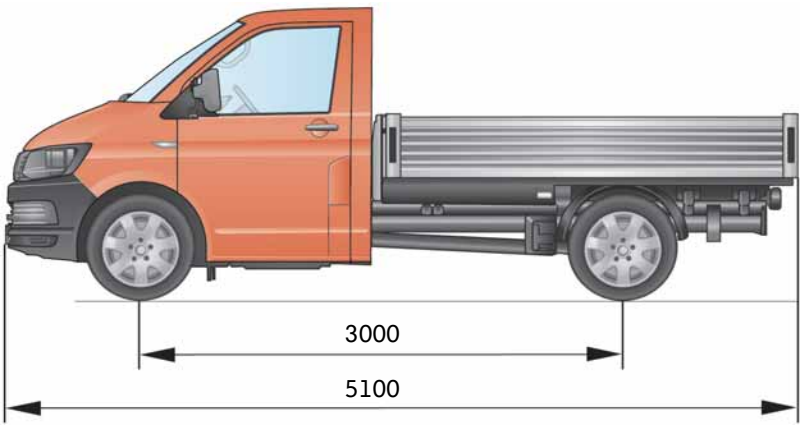
Technical data

Platform

Platform
Single cab
e.g. short wheelbase



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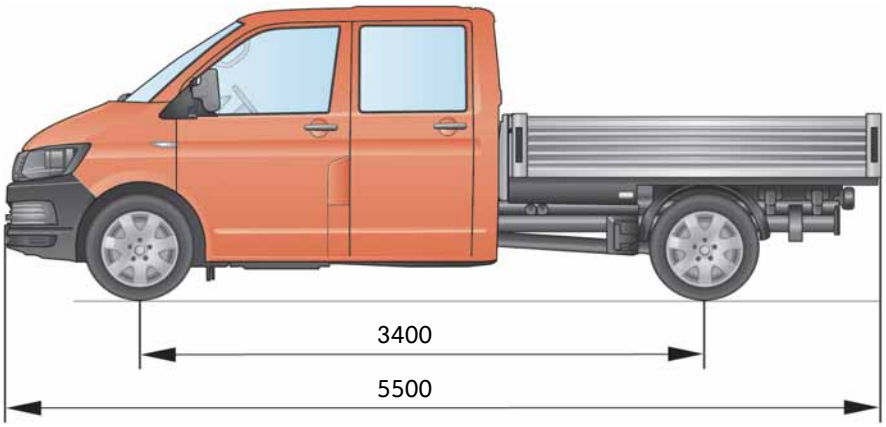
Platform
Double cab
generally with long wheelbase



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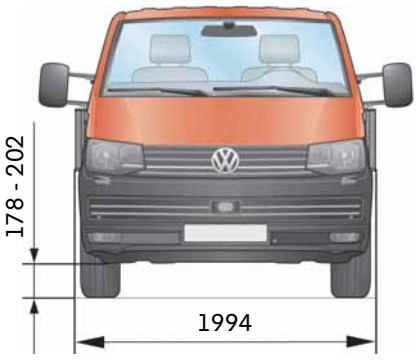

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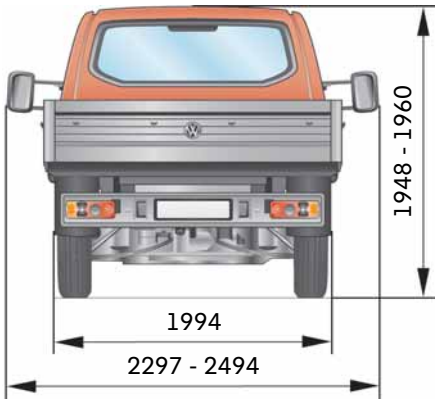
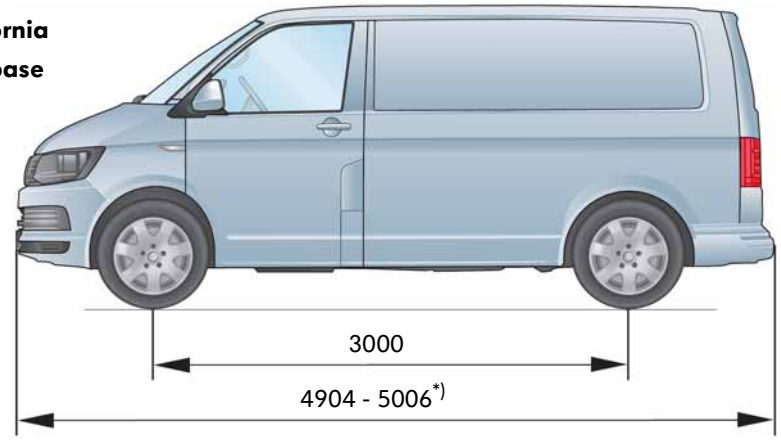


S561_007

The illustrations only show selected variants and their dimensions/dimension areas. For the complete technical data for the entire model range, please refer to the current sales literature.

Panel van, window van, Caravelle, Multivan, California

Panel van, California
e.g. short wheelbase



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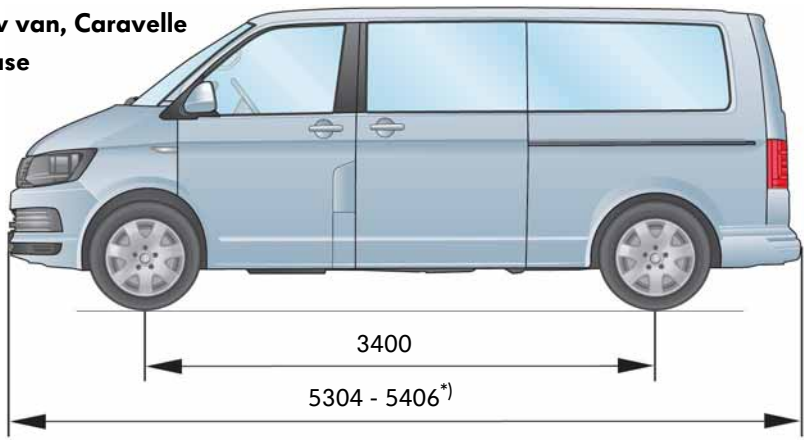
Multivan, window van, Caravelle
e.g. long wheelbase



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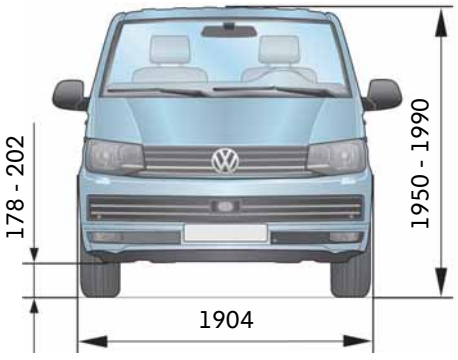

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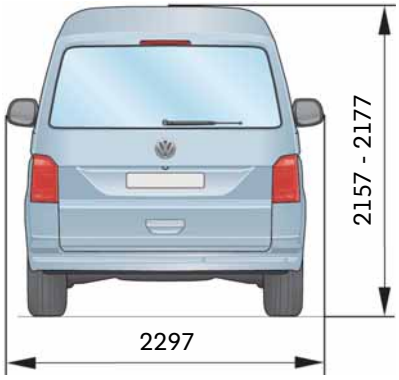

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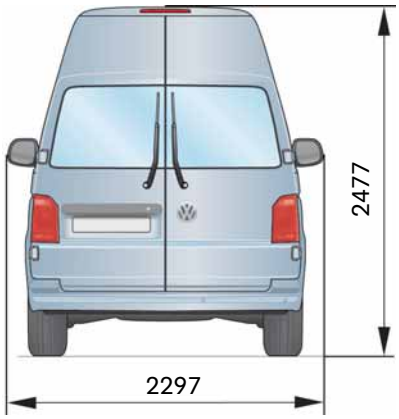


S561_012

Turning circles

Short wheelbase	Long wheelbase
11.9 m	13.2 m

*) With rigid tow hitch

The body

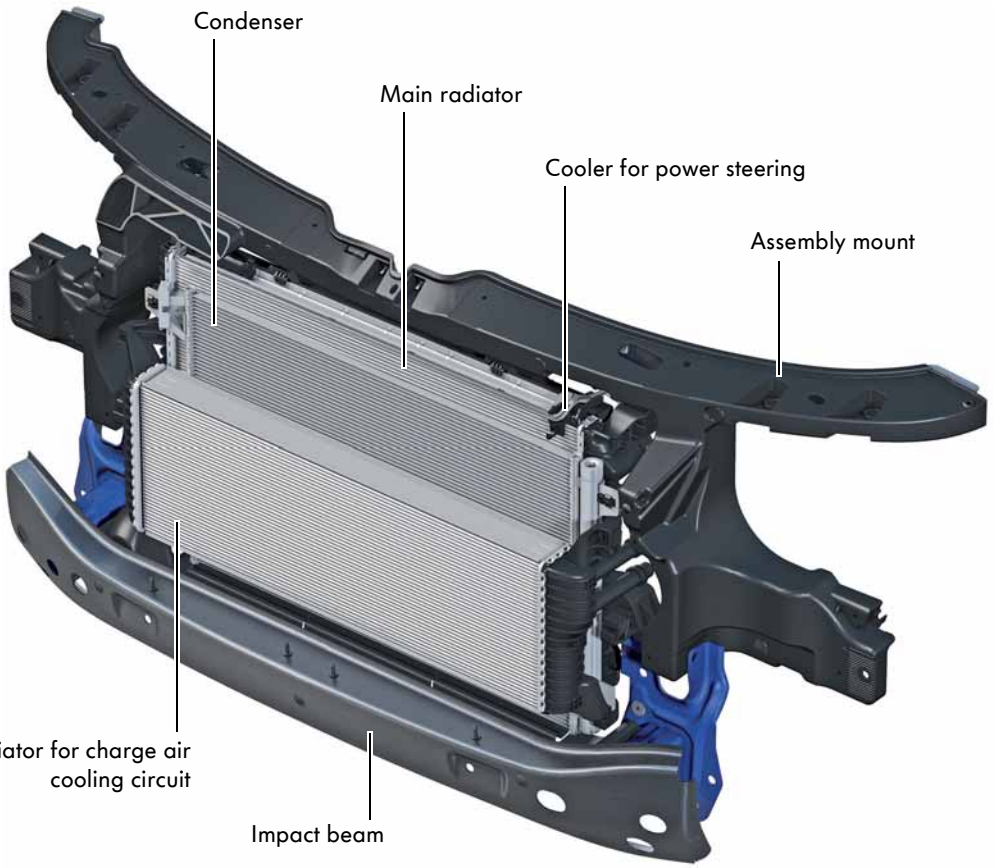
To a large extent, the body has been taken from the previous model. The front and rear ends have been redesigned. They have been adapted to the current family face at Volkswagen and are the same for Multivan, Caravelle, California and commercial vehicles.

New features on the body:

- Engine lid
- Wing
- Radiator grille with Volkswagen badge
- Front bumper
- Rear bumper
- Larger tank cap
- Tailgate with large window cut-out

S561_065

Front end



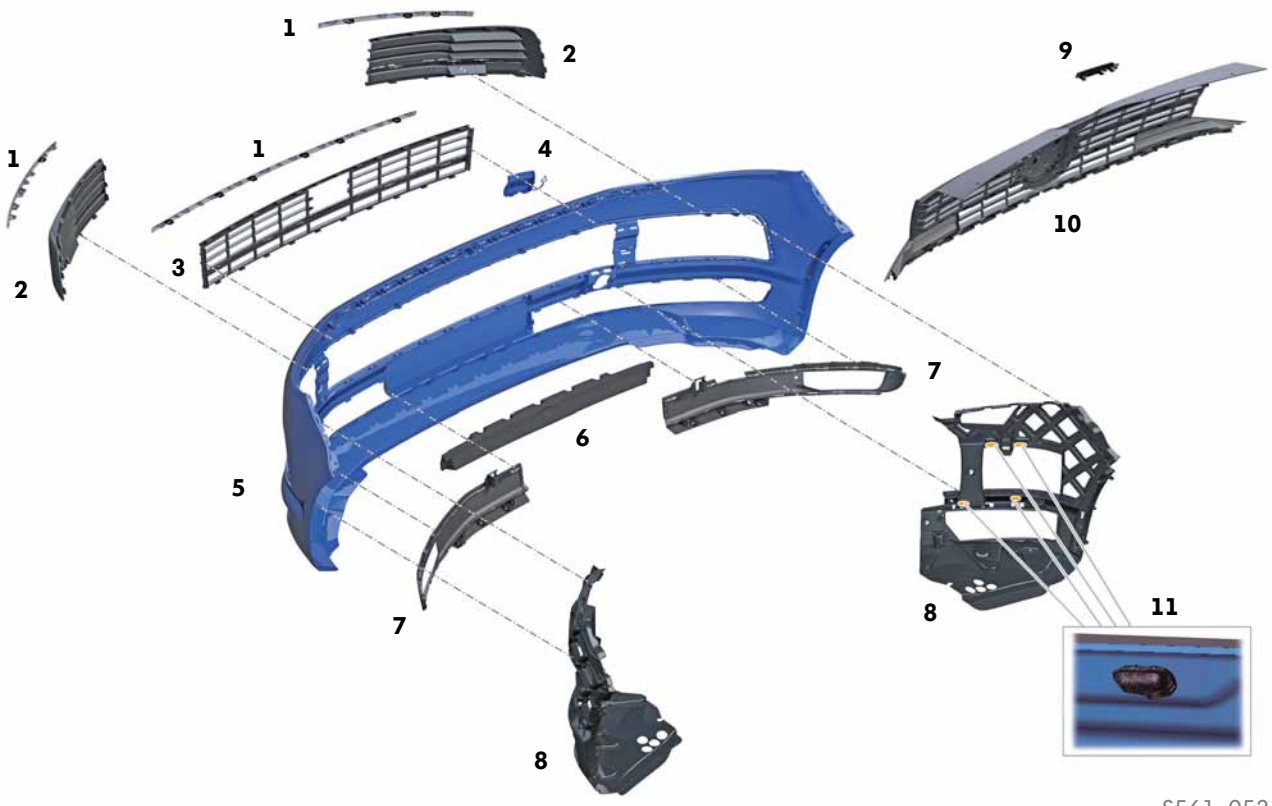
S561_055

Bumper

The bumper including its add-on parts represents a new design. Bumper cover and radiator grille form one structural unit in the non-painted, grained version. In painted bumpers, the radiator grille is separate. The ventilation grilles are inserted and locked into the bumper cover from the front, while the trims for the fog lights are from the rear. The bumper cover is stabilised at the rear using 2 support inserts fitted at the sides. In addition, the support inserts serve as carriers for add-on parts such as the fog lights.

The support inserts are connected to the bumper cover using clips and 4 additional bonded connections. The bonded connections provide spot connections for the thermoplastic materials of the bumper cover and the support insert. The trims of the fog lights are covered by the support inserts. To be able to remove the trims, it is first necessary to move the particular support insert.

The illustration shows the painted version



S561_053

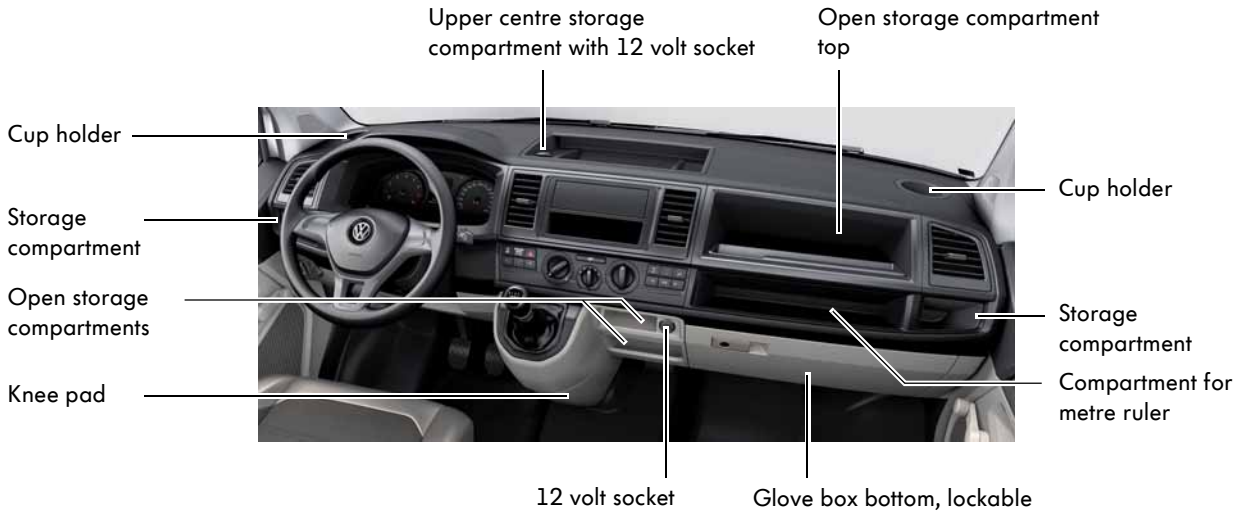
Legend

1 Trim strip
2 Air intake grille
3 Radiator grille centre
4 Cap for towing eye
5 Bumper cover
6 Foam part
7 Trim for fog light
8 Support insert
9 Lettering
10 Radiator grille
11 Bonded connection

The interior

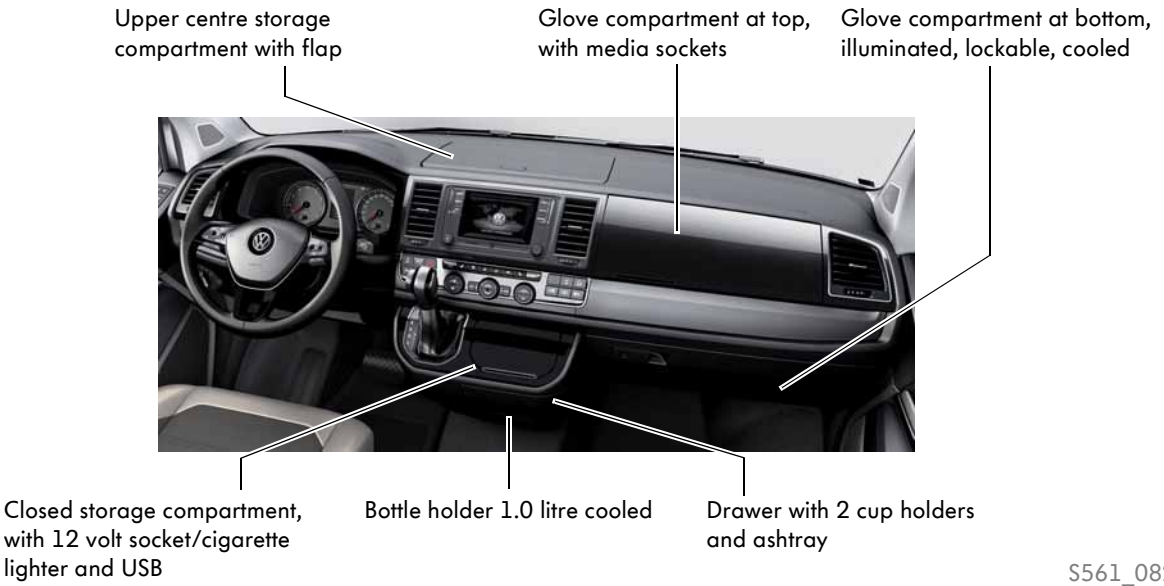
Dashboards

The dashboards of the T6 2016 have been completely newly developed and are available in 2 variants. Both variants feature a new design and offer an improved storage concept with expanded storage compartments and cup holders. The dash panel is offered in an additional variant with a wide centre console. This corresponds to the centre console of the Convenience dashboard.



S561_083

The Convenience dashboard offers an expanded range of storage options in the new design. The storage compartments are closed in all cases. The Convenience dashboard is visually uprated by decorative inlays and painted trims with a different structure, colour and surface composition. Trims and decorative inlays can be individually assembled. The Convenience dashboard is available for left and right-hand drive vehicles.



S561_082

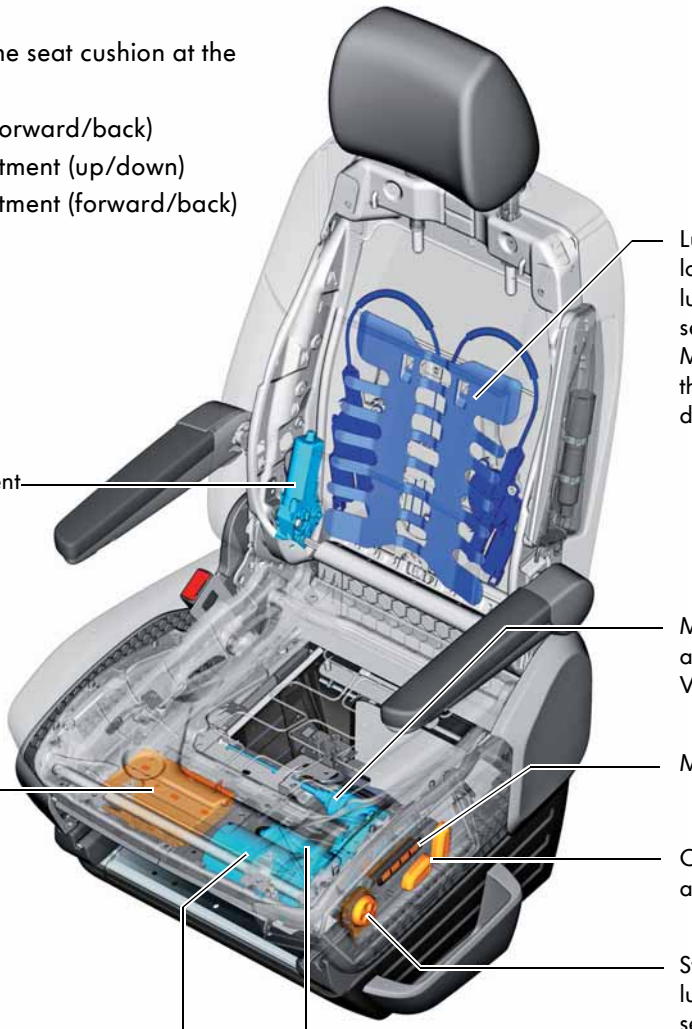
Electrically adjustable driver and front passenger seats (12-way seat)

The 12-way seat guarantees comfortable and fatigue-free travelling – even over long distances. The comfortable feeling is achieved by setting an individually matching seat position. This is achieved by the extensive adjustment options of the seat, allowing it to adapt to different physiques. The lumbar support integrated in the backrest reduces strain on the spine.

The driver seat is offered with a memory function. 3 seat positions can be stored using the memory buttons. In addition, the seat position can be stored using the remote control.
One of 3 memory seat positions can be allocated to each remote control key. The control unit for driver seat adjustment takes over control of the memory function and activates the control motors.

Electrical adjustment:

- Seat longitudinal adjustment (forward/back)
- Angle adjustment of the seat cushion at front (up/down)
- Angle adjustment of the seat cushion at the rear (up/down)
- Backrest adjustment (forward/back)
- Lumbar support adjustment (up/down)
- Lumbar support adjustment (forward/back)



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Easy-Entry seat in window van and Caravelle

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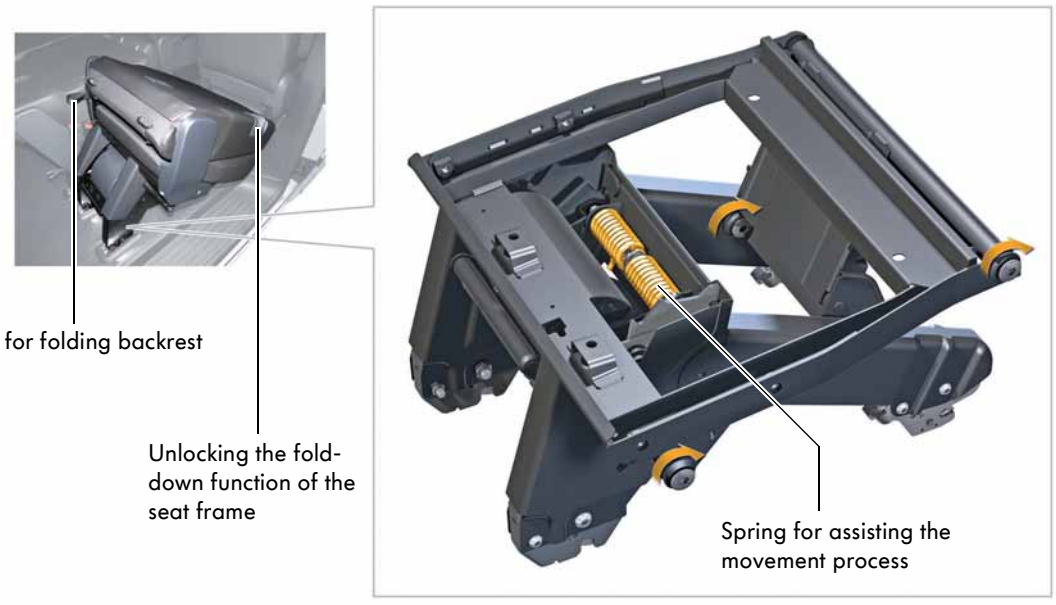
S561_107

S561_108

The window van and Caravelle feature improved Easy-Entry seats in the 2nd seat row. The folding function of the seat frame makes it easier to get into the 3rd seat row. In vehicles with a sliding door, an Easy-Entry seat is always fitted on the sliding door slide. In vehicles with 2 sliding doors, Easy-Entry seats are fitted on the outer positions of the 2nd seat row. This permits access to the 3rd seat row through both sliding doors. The middle seat is always configured as an individual seat. The folding function of the backrest is a new feature for the Easy-Entry seat. This improves the loading possibilities and creates a continuous load bed in the passenger compartment. All backrests of the seats in the passenger compartment are folding. The seats can be removed individually.



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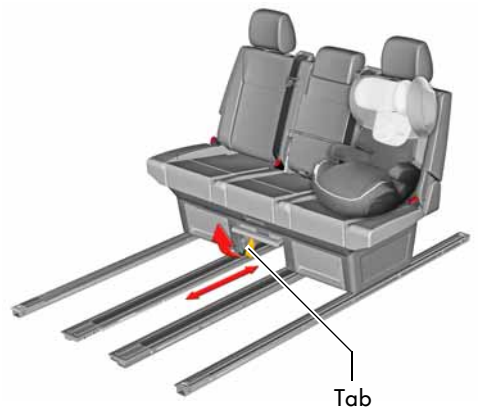
The seat frame can now be folded down in the T6 2016 without locking. The movement sequence is supported by a spring fitted in the seat frame. This reduces the actuation forces when folding the seat frame. The spring is tensioned when the seat is folded up. After the unlocking mechanism has been activated, the seat frame automatically lowers into the folded position.

3-seat bench in the Multivan

The 3-seat bench in the Multivan has a new operating logic. The seat bench in the T6 2016 can be moved when the backrest is upright. This improves the operating convenience, especially when using child seats. The locking mechanism has been redesigned for this purpose.

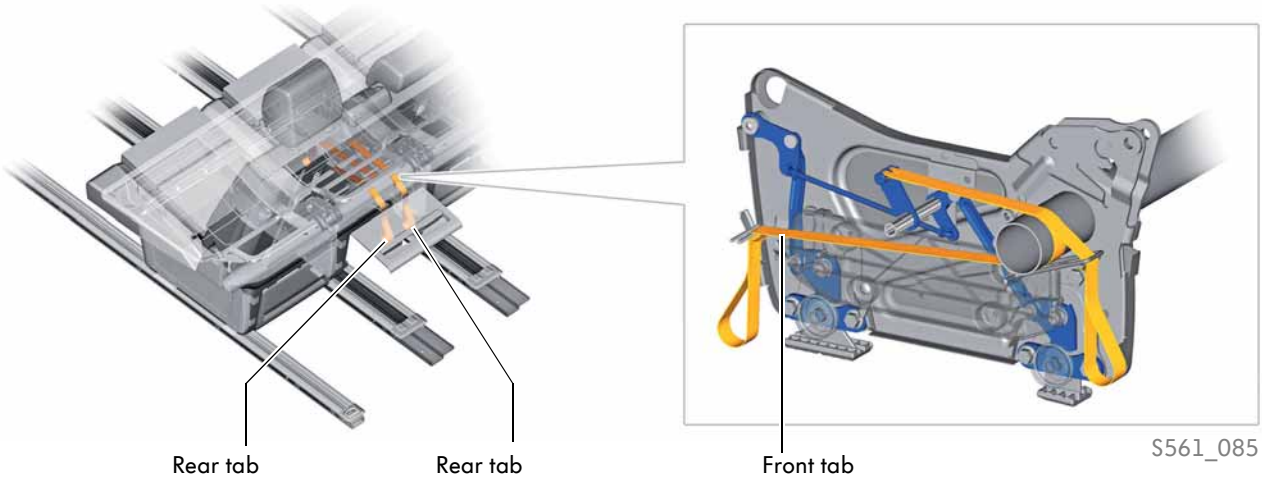


S561_084

Tab
Pull for front/back adjustment

Locking mechanism

The locking mechanism for front/back movement can be operated from the front or rear using a tab.



S561_085

Rear tab
for backrest folding

Rear tab
for front/back adjustment

Front tab
for front/back adjustment

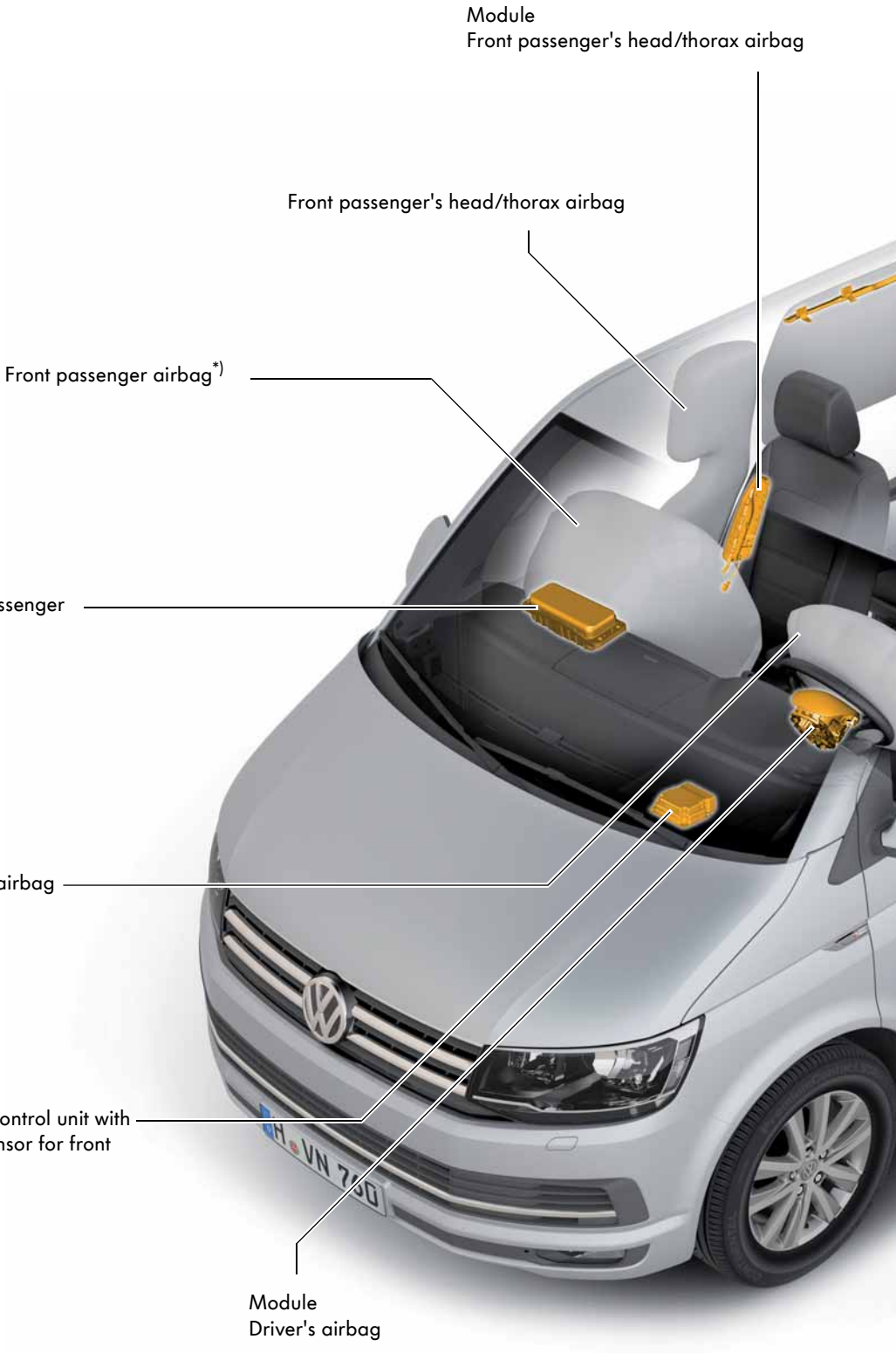
Slide blocks

The bench can be moved when the backrest is upright. Pushing the top end of the backrest exerts an increased tilting moment on the bench. To avoid the bench being tilted due to the increased tilting moment, slide blocks are attached to the outside front locking points of the bench.

S561_086

Slide block

Occupant protection



*) In vehicles with a double front passenger seat, an airbag with an increased fill volume is used.

S561_131

Power units

The T6 2016 features new petrol and diesel engines from Volkswagen Commercial Vehicles. All engines comply with the strict emission standard EU6.

TSI engines

The 2.0 l TSI engines of the EA888 series are fitted in the T6 2016. 2 power levels are used.

TDI engines

4 power levels can be selected by the customer according to requirements on the basis of the 2.0 l TDI engine (EA288 engine series) with common rail direct injection. Each version will attract customers by extremely low consumption and emissions values.

Emission standard EU6

All new engines of the T6 2016 meet the emission standard EU6. Exhaust post treatment to reduce nitrous oxides is required for all diesel engines. An SCR system (Selective Catalytic Reduction system) is used for this purpose.

TDI engines with emission standard EU5

Until further notice, the tried-and-tested engines in the EA189 and EA888 series will be offered in specific markets. These engines comply with emission standards EU2 to EU6.

For more information about these engines, please refer to the Self-Study Programme no. 453 "The T5 2010".

For more information about the cooling system of the 2.0 l TDI engine, please refer to the Self-Study Programme no. 564.

The TSI engines

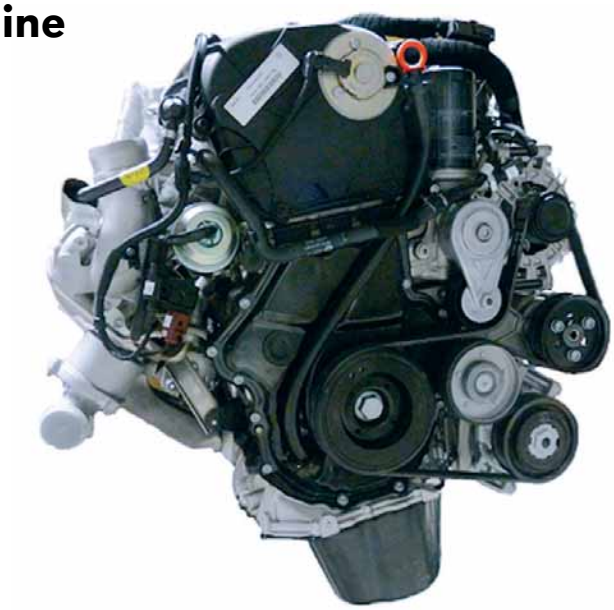
	2.0 l 110 kW TSI engine CJKB	2.0 l 150 kW TSI engine CJKA
		
6-speed manual gearbox 0A5		
7-speed dual clutch gearbox 0BT		

The TDI engines

	2.0 l 62 kW TDI engine CXGA	2.0 l 75 kW TDI engine CXGB	2.0 l 110 kW TDI engine CXHA	2.0 l 110 kW TDI engine CXFA	2.0 l 150 kW TDI engine CXEB
					
5-speed manual gearbox 02Z					
6-speed manual gearbox 0A5					
7-speed dual clutch gearbox 0BT					

The 2.0 l 110/150 kW - TSI engine

The engine is in the EA888 engine series. The 2 power levels are determined by the engine management.



S561_147

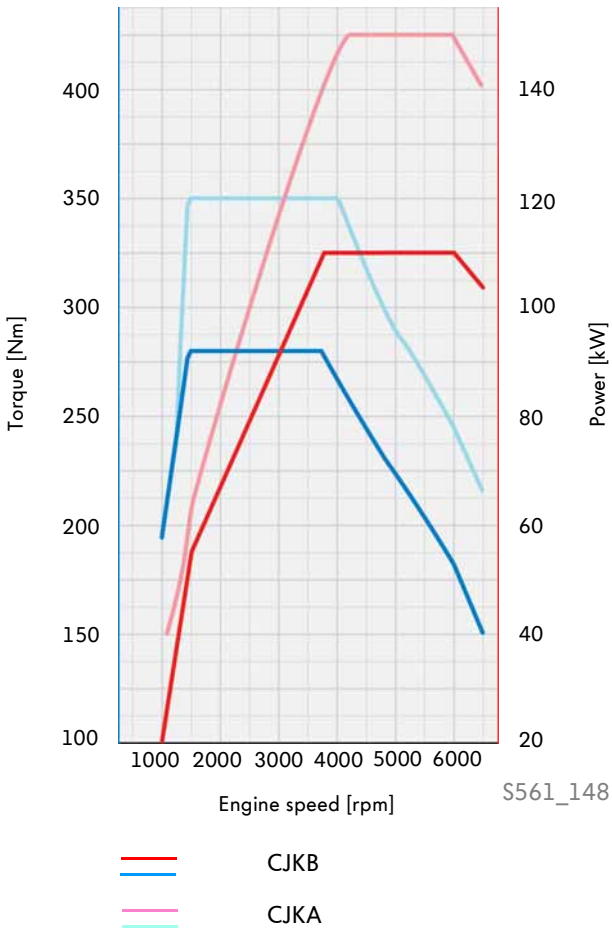
Technical features

- Valve control by timing chain
- Adjustable inlet camshaft
- Changeover of the opening travel of the exhaust valves
- Balance shafts in the cylinder block with chain drive
- Maintenance-free chains
- Belt-driven coolant pump module

Technical data

Engine code	CJKB	CJKA
Cubic capacity	1984 cm^3	
Design	4-cylinder inline engine	
Valves per cylinder	4	
Bore	82.5 mm	
Stroke	92.8 mm	
Compression ratio	9.8 : 1	
Max. power	110 kW at 3750 – 6000 rpm	150 kW at 4200 – 6000 rpm
Max. torque	280 Nm at 1500 – 3750 rpm	350 Nm at 1500 – 4000 rpm
Engine management	Bosch Motronic MED 17.5	
Fuel	Regular unleaded with RON 95	
Turbocharger	Wastegate turbolader	
Emissions standard	EU6	

Torque and power diagram



S561_148

The 2.0 l 62 kW TDI engine

The engine is in the EA288 engine series and is only used in the T6 2016 in this design.

Technical features

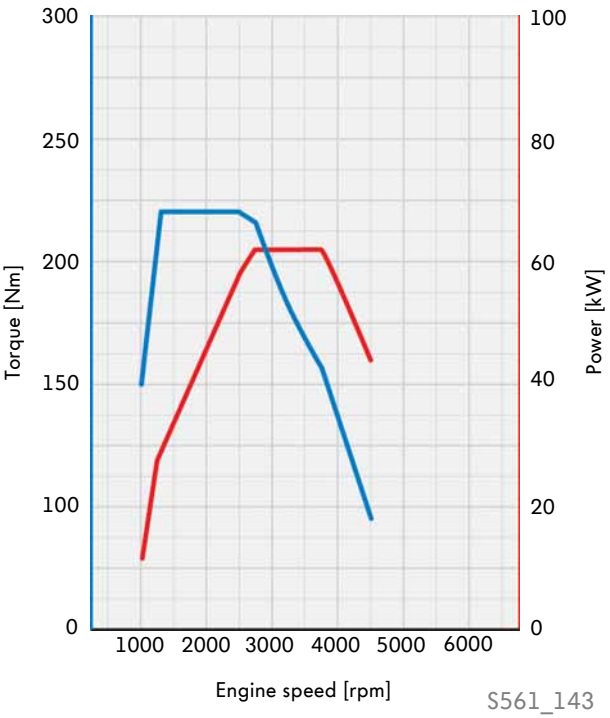
- Liquid-cooled charge air cooler
- High-pressure exhaust gas recirculation
- Delphi common rail direct injection
- Liquid-cooled injector for reducing agent
- Injectors with solenoid valve
- Single-piston high-pressure pump

S561_138

Technical data

Engine code	CXGA
Cubic capacity	1968 cm^3
Design	4-cylinder inline engine
Valves per cylinder	4
Bore	81.0 mm
Stroke	95.5 mm
Compression ratio	15.5 : 1
Max. power	62 kW at 2750 – 3750 rpm
Max. torque	220 Nm at 1250 – 2500 rpm
Engine management	Delphi DCM6.2
Fuel	Diesel acc. to DIN EN 590
Turbocharger	VTG turbocharger
Exhaust gas recirculation	Yes
Emissions standard	EU6 with diesel particulate filter

Torque and power diagram



S561_143

The 2.0 l 75 kW TDI engine

The engine is in the EA288 engine series and is only used in the T6 2016 in this design. The additional output compared to the variant with 62 kW is achieved by engine management.

Technical features

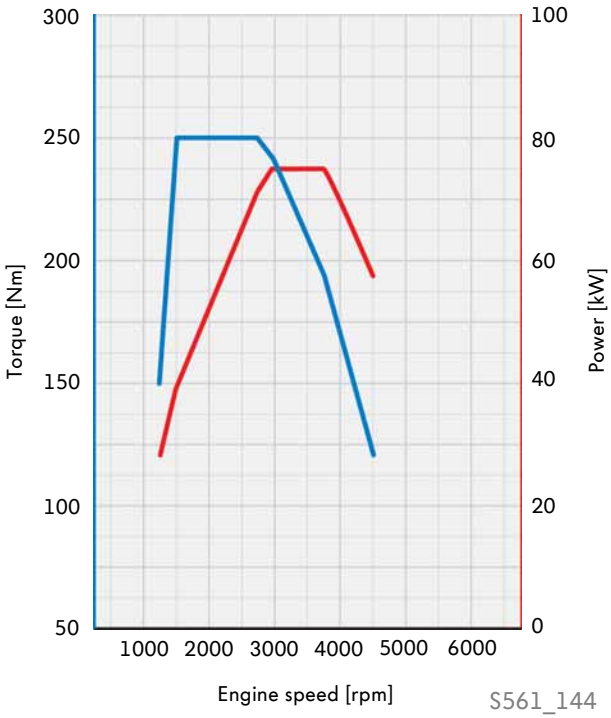
- Liquid-cooled charge air cooler
- High-pressure exhaust gas recirculation
- Delphi common rail direct injection
- Liquid-cooled injector for reducing agent
- Injectors with solenoid valve
- Single-piston high-pressure pump

S561_138

Technical data

Engine code	CXGB
Cubic capacity	1968 cm^3
Design	4-cylinder inline engine
Valves per cylinder	4
Bore	81.0 mm
Stroke	95.5 mm
Compression ratio	15.5 : 1
Max. power	75 kW at 3000 – 3750 rpm
Max. torque	250 Nm at 1500 – 2750 rpm
Engine management	Delphi DCM6.2
Fuel	Diesel acc. to DIN EN 590
Turbocharger	VTG turbocharger
Exhaust gas recirculation	Yes
Emissions standard	EU6 with diesel particulate filter

Torque and power diagram



S561_144

The 2.0 l 110 kW TDI engine

The engine is in the EA288 engine series and is only used in the T6 2016 in this design. The engine with the CXFA code has balance shafts integrated in the cylinder block.

Technical features

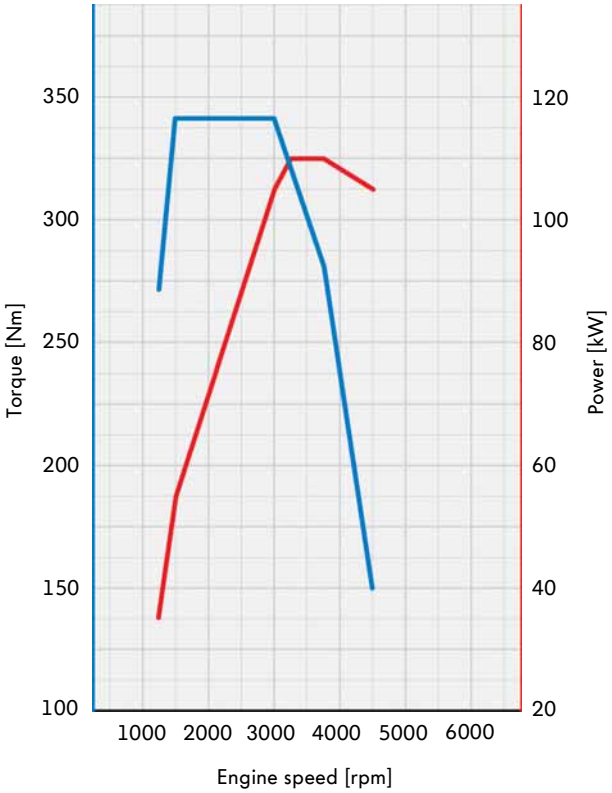
- Liquid-cooled charge air cooler
- High-pressure exhaust gas recirculation
- Delphi common rail direct injection
- Liquid-cooled injector for reducing agent
- Injectors with solenoid valve
- Single-piston high-pressure pump

S561_138

Technical data

Engine code	CXHA	CXFA
Cubic capacity	1968 cm^3	
Design	4-cylinder inline engine	
Valves per cylinder	4	
Bore	81.0 mm	
Stroke	95.5 mm	
Compression ratio	15.5 : 1	
Max. power	110 kW at 3250 – 3750 rpm	
Max. torque	340 Nm at 1500 – 3000 rpm	
Engine management	Delphi DCM6.2	
Fuel	Diesel acc. to DIN EN 590	
Turbocharger	VTG turbocharger	
Exhaust gas recirculation	Yes	
Emissions standard	EU6 with diesel particulate filter	

Torque and power diagram



S561_145

The 2.0 l 150 kW TDI engine

The engine is in the EA288 engine series and is only used in the T6 2016 in this design. This engine has balance shafts integrated in the cylinder block and a biturbo unit.

S561_139

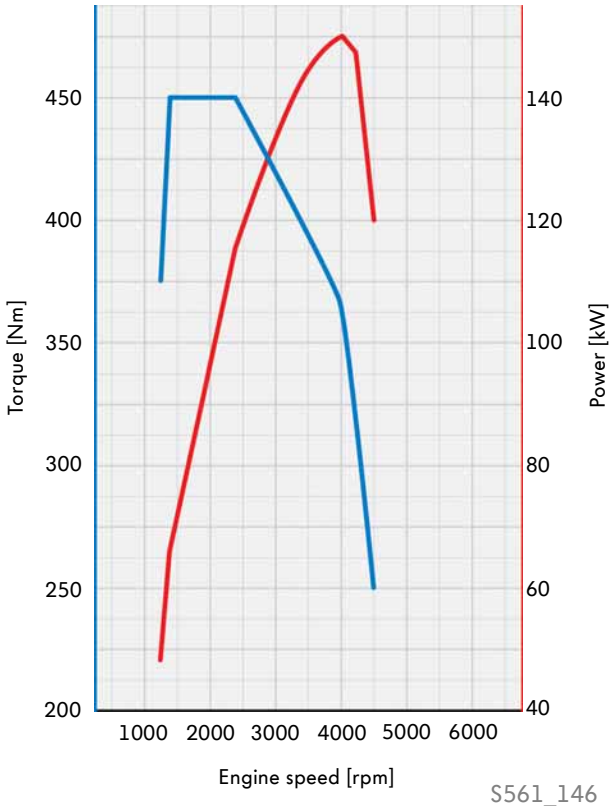
Technical features

- Liquid-cooled charge air cooler
- High-pressure exhaust gas recirculation
- Delphi common rail direct injection
- Liquid-cooled injector for reducing agent
- Injectors with solenoid valve
- Two-piston high-pressure pump
- 2 high-pressure lines from the high-pressure pump to the rail

Technical data

Engine code	CXEB
Cubic capacity	1968 cm^3
Design	4-cylinder inline engine
Valves per cylinder	4
Bore	81.0 mm
Stroke	95.5 mm
Compression ratio	15.5 : 1
Max. power	150 kW at 4000 rpm
Max. torque	450 Nm at 1400 – 2400 rpm
Engine management	Delphi DCM6.2
Fuel	Diesel acc. to DIN EN 590
Turbocharger	VTG turbocharger
Exhaust gas recirculation	Yes
Emissions standard	EU6 with diesel particulate filter

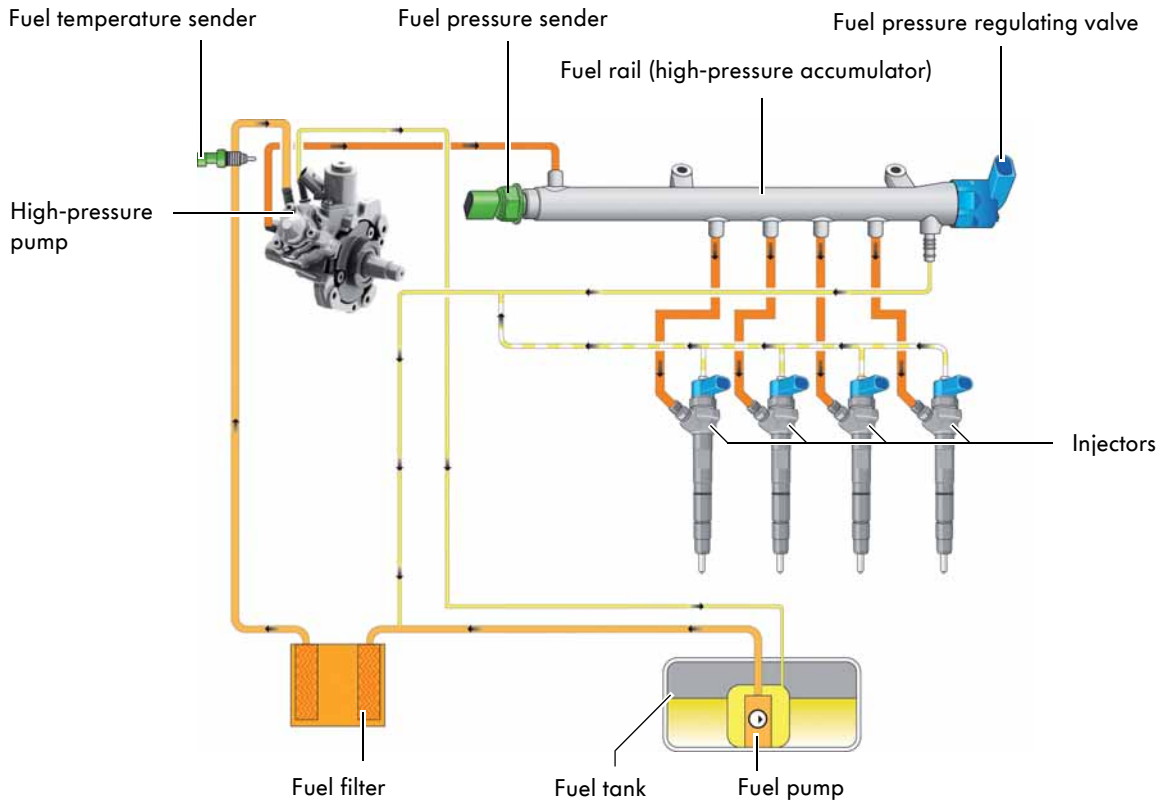
Torque and power diagram



S561_146

The injection system

A new common rail injection system from Delphi is used in the T6 2016. It has a max. injection pressure of 2000 bar. A single-piston high-pressure pump is fitted in the 2.0 l TDI engines with 62 kW to 110 kW. A two-piston high-pressure pump is used in the 2.0 l TDI engine with 150 kW. The rails in both engines also differ from one another in terms of volume and weight.

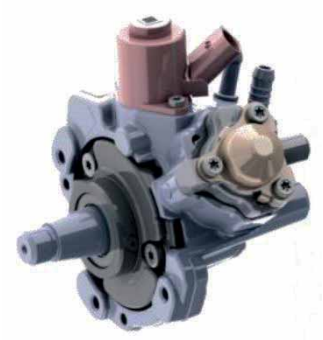


S561_150

Legend

- Fuel high pressure max. 2000 bar
- Fuel return
- Fuel supply pressure 4 - 6 bar
- Fuel return from the injectors

Single-piston high-pressure pump



S561_151

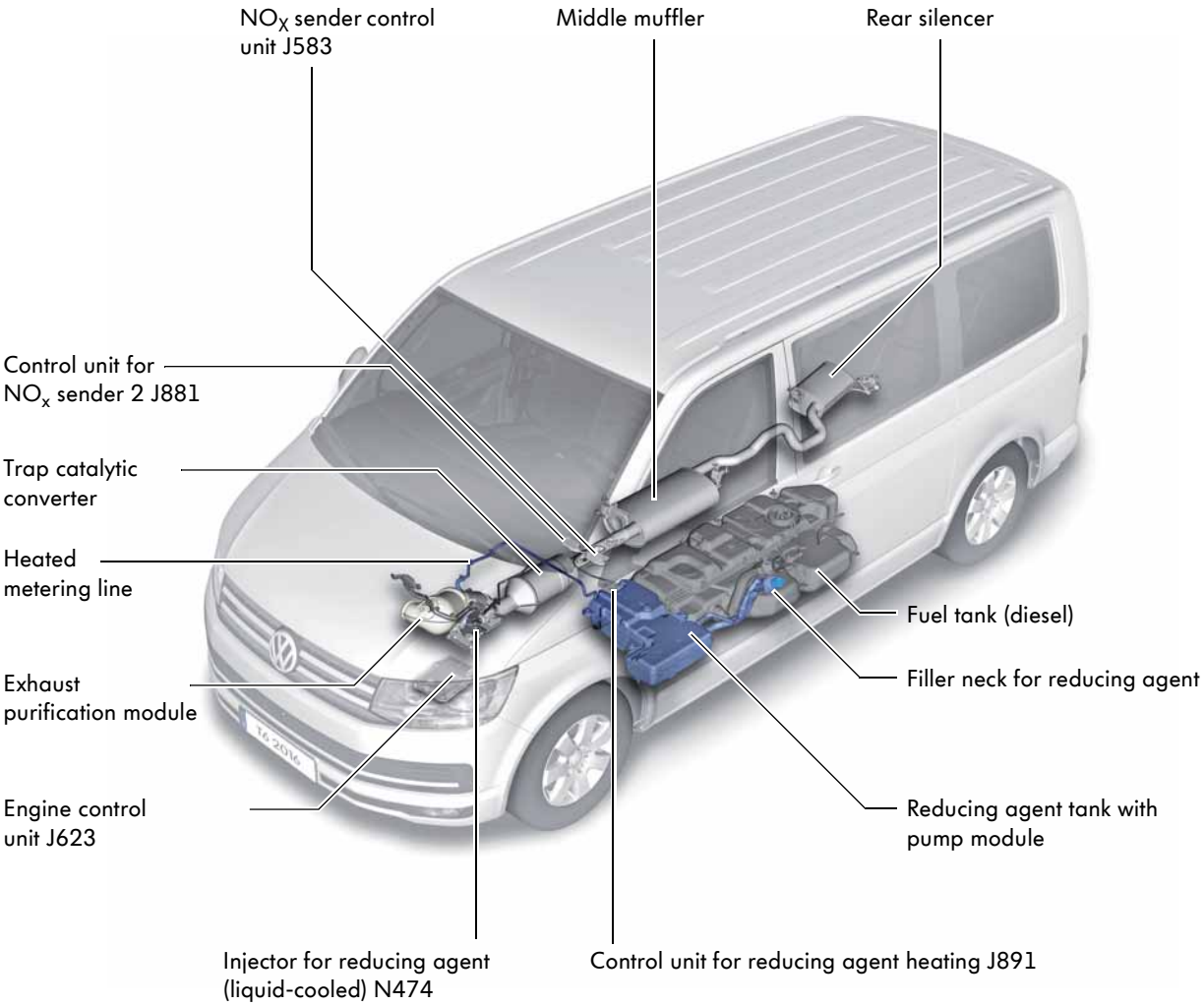
Two-piston high-pressure pump

S561_152

The exhaust post-treatment with SCR system

An SCR system is used in the T6 2016 to achieve the EU6 emissions limits in engines of the modular diesel system (EA288 series). The abbreviation SCR stands for selective catalytic reduction. In this technology, the chemical reduction reaction is selective. This means only the nitrogen oxides specifically are reduced amongst the exhaust gas constituents. The nitrous oxides (NO_x) contained in the exhaust gas are converted into nitrogen (N_2) and water (H_2O) in the catalytic converter. For this purpose, a reducing agent is continuously injected into the exhaust gas stream ahead of the SCR catalytic converter. The reducing agent is carried in a separate additional tank.

Overview

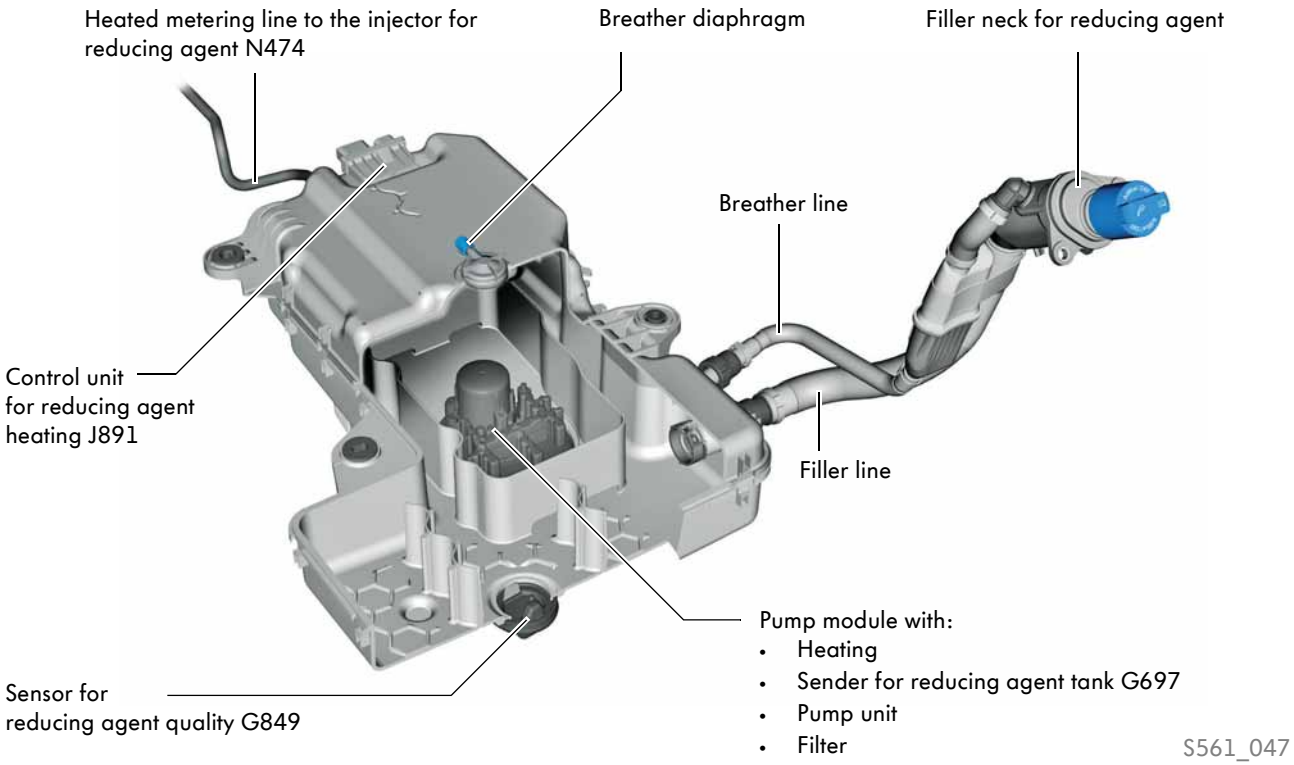


S561_043

For more information about exhaust post-treatment with the SCR system, please refer to the self-study programme no. 446 "The 2.5 l TDI EURO V engines with SCR system in the Crafter – design and function".

Reducing agent tank

In addition to the fuel tank with a capacity of about 70 or 80 litres, there is also a reducing agent tank with a capacity of about 13 litres. The reducing agent tank contains the filler neck with an operating breather and vent, the control unit for reducing agent heating J891, the sensor for reducing agent quality G849 and the pump module. The pump module is firmly bonded onto the reducing agent tank. It contains a pump for pumping the reducing agent out and back (pump unit) as well as the sender for reducing agent level G697. Only the pump unit is screwed on and can be replaced during servicing. All functions are activated and controlled via the engine control unit J623.



S561_047

Filling

The reducing agent tank is replenished via a filler neck below the fuel filler neck behind the left vehicle door, and is sealed by a blue tank cap.

The minimum and maximum replenishing quantity of reducing agent is shown on the dash panel insert display. If a message of this type appears, it is necessary for at least the minimum replenishment quantity to be filled.

S561_048

The 4WD coupling generation V

In the T6 2016, 4-wheel drive is offered in all vehicle variants with the following engines:

- 2.0 l 110 kW TDI engine
- 2.0 l 150 kW TDI engine
- 2.0 l 150 kW TSI engine

Optionally, a mechanical differential lock for the rear final drive is offered in all vehicles with 4-wheel drive. The differential lock has been taken from the previous model.
The 4WD coupling is integrated into the rear final drive. The 4WD coupling between the front and rear final drives controls the drive torque to the rear axle. It directs the required torque to the rear axle depending on the pressure in the multi-plate clutch.

Structure and function

The Haldex coupling of generation V is characterised primarily by a new pressure control. The hydraulic pressure required for the 4WD coupling is generated by a pump with centrifugal force controller. This technology has allowed the weight to be reduced compared to generation IV of the 4WD coupling (Haldex) by 1.7 kg.

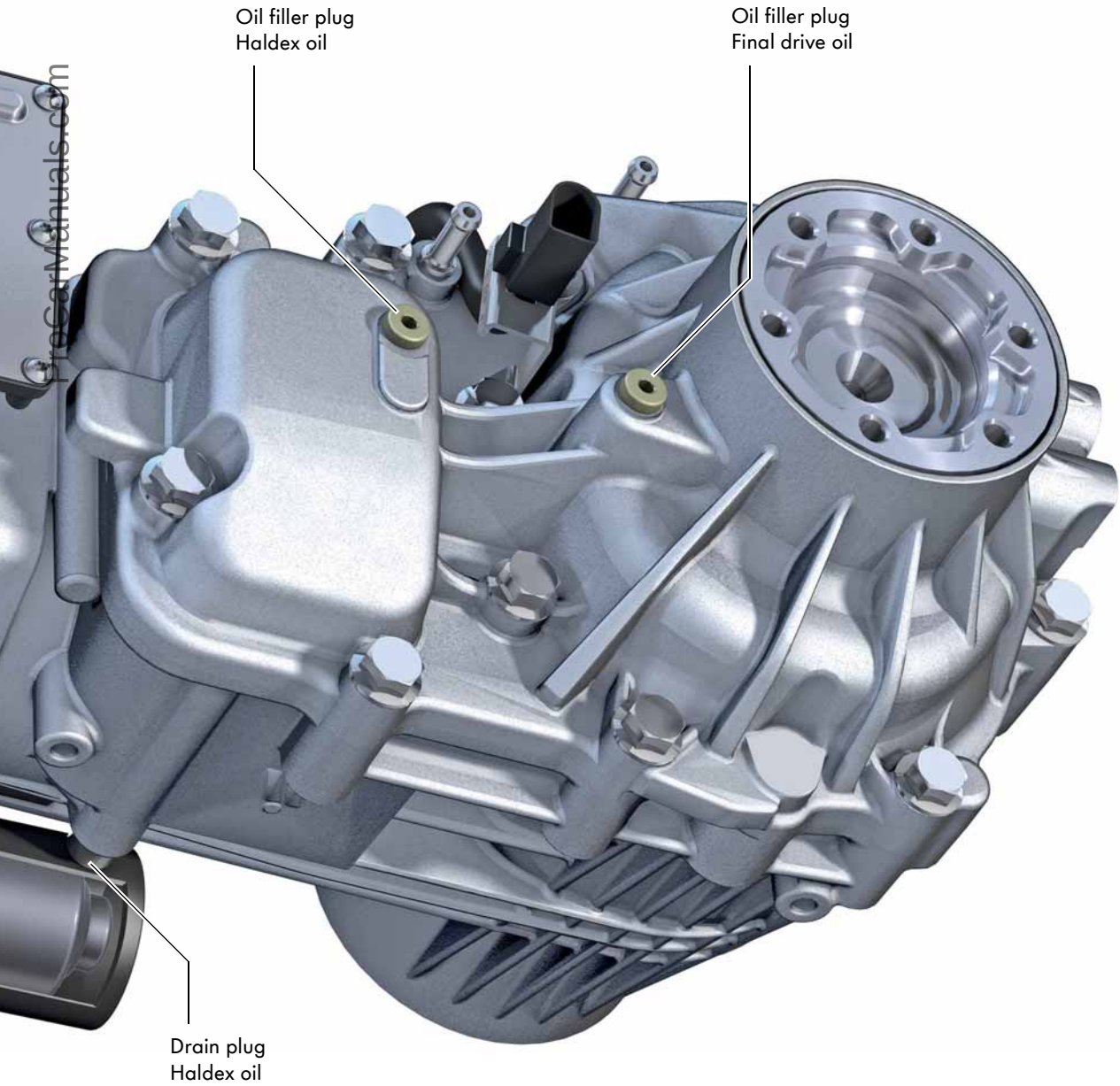
The control logic in the various driving situations has been taken from generation IV of the 4WD coupling (Haldex), see Self-Study Programme no. 414 "4MOTION with 4WD coupling generation IV".

The oil change in the T6 2016 is every 3 years or every 60,000 km. Please use the correct oil filler and drain plug! For more information, refer to the electronic service information system (ElsaPro).

Pump for Haldex coupling V181

In the T6 2016, the pump for Haldex coupling V181 is protected by a rubber stone deflector.

S561_052



S561_069

Overview of the running gear and driver assist systems

The overview shows important running gear equipment of the T6 2016 that is fitted as standard and optionally. It can be equipped with standard running gear, reinforced running gear or heavy-duty running gear.

Running gear

The design of the running gear and brake system is based on the technology of the previous model:

- Suspension strut front axle according to the McPherson principle
- Semi-trailing arm rear axle with independent suspension
- Depending on equipment 16-inch and 17-inch brake system

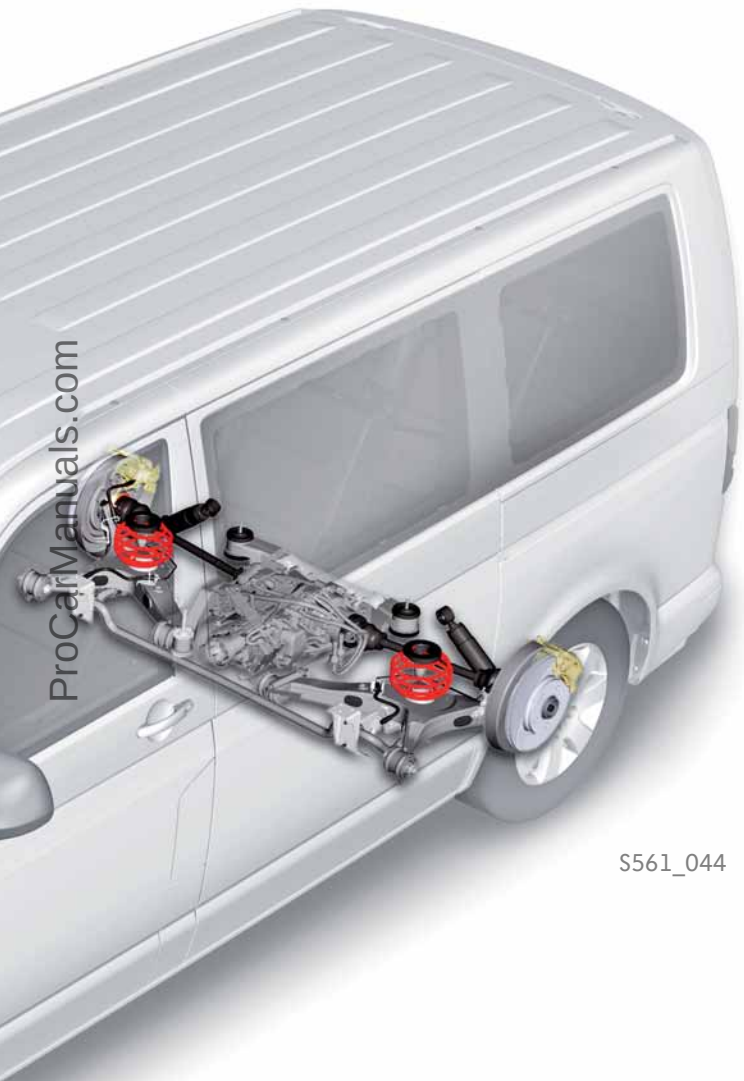
New features:

- ABS/ESC Continental MK 100
- Brake pad wear indicator as standard in all vehicles on the front and rear axles

The ESP unit is fitted on the left longitudinal member in the engine compartment. It comprises the control unit for ABS J104 and the hydraulic unit.

Driver assistance systems

- Cruise control system (CCS)
- Adaptive cruise control (ACC)
- Dynamic chassis control (DCC)
- Front scan system (Front Assist) with Automatic Emergency Braking (AEB)
- Multicollision brake
- Main beam assist (FLA)
- Parking distance control
- Reversing assistant (rear view camera system)
- Tyre pressure monitor (TPM+)
- Driver Alert System (DAS)
- Lane-change assistant (Side Assist)
- Hill-descent assist



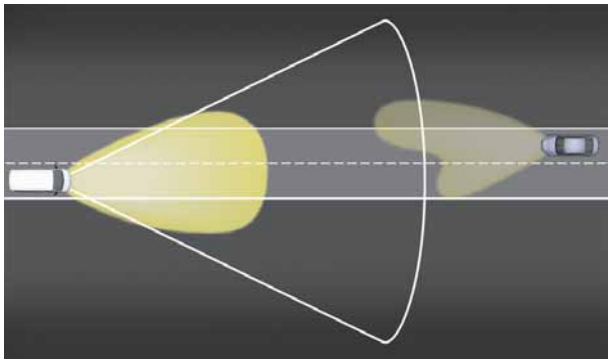
S561_044

Control unit for ABS J104

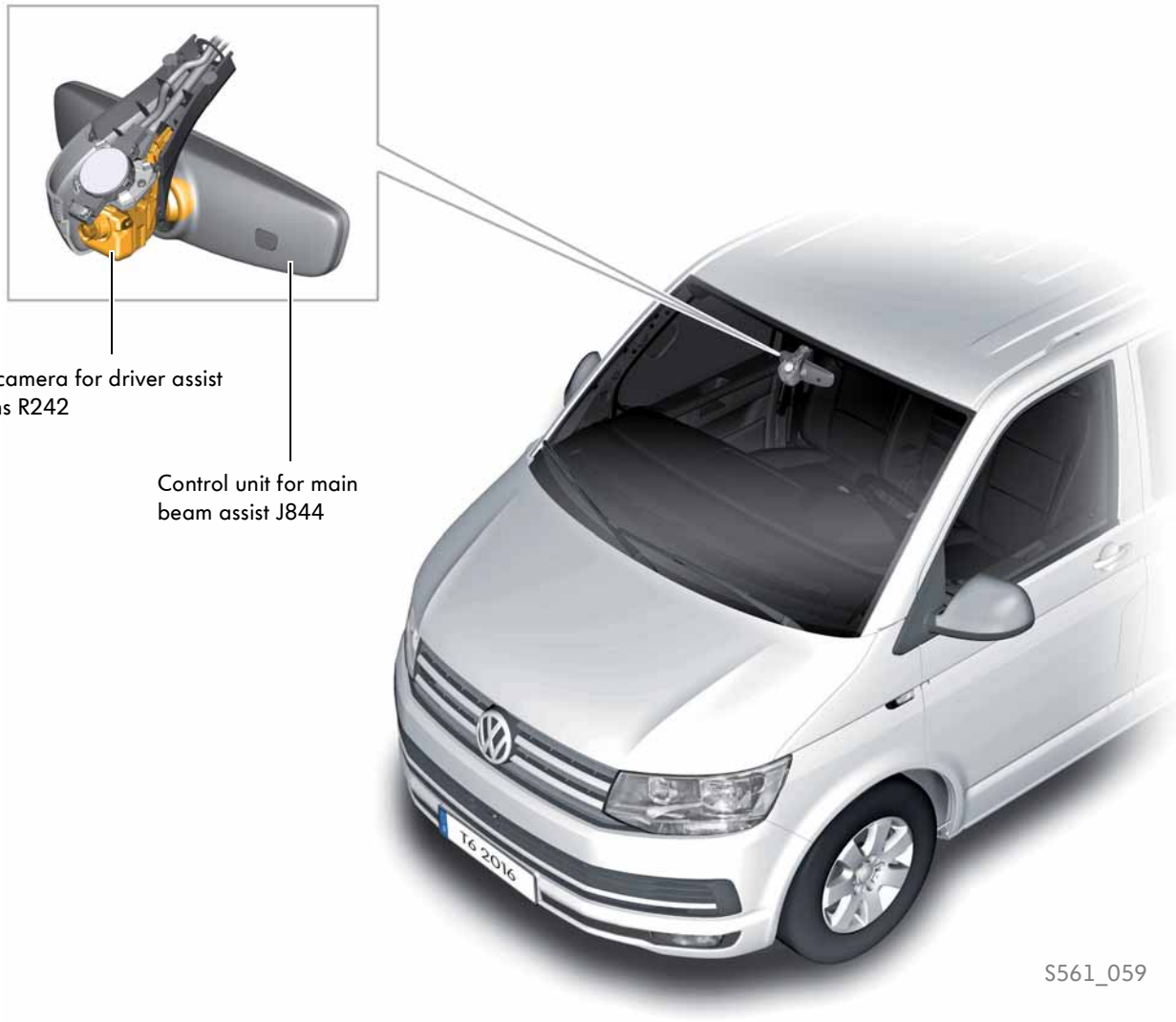
The yaw rate sender G202, the lateral acceleration sender G200 and the longitudinal acceleration sender G251 are integrated in the ABS control unit J104. In addition to the familiar functions from the previous model, the ABS control unit J104 additionally provides assistance systems such as the tyre pressure monitoring display TPM+, the multicollision brake and downhill assist function.

The high beam assistant (FLA)

The high-beam assistant permits the high beams to be switched on and off automatically depending on the traffic situation. The "eye" of the system is an RGB camera with a resolution of about 0.5 megapixels that is accommodated in the mirror base.
The main beam assist is integrated in the data bus network via the CAN-bus for the dash panel insert.



S561_060



S561_059

For more information about the main beam assist, please refer to the Self-Study Programme no. 498 "The Golf convertible 2012".

The lane change assist (Side Assist)

Optionally and depending on the model, the T6 2016 (closed bodies, short wheelbase and tailgate) is available with lane change assist (Side Assist).

The lane change assist warns the driver about vehicles located at the side in the blind spot, or which are approaching quickly from behind. For this purpose, 2 radar sensors monitor the area both at the sides and rear in the adjacent lanes.

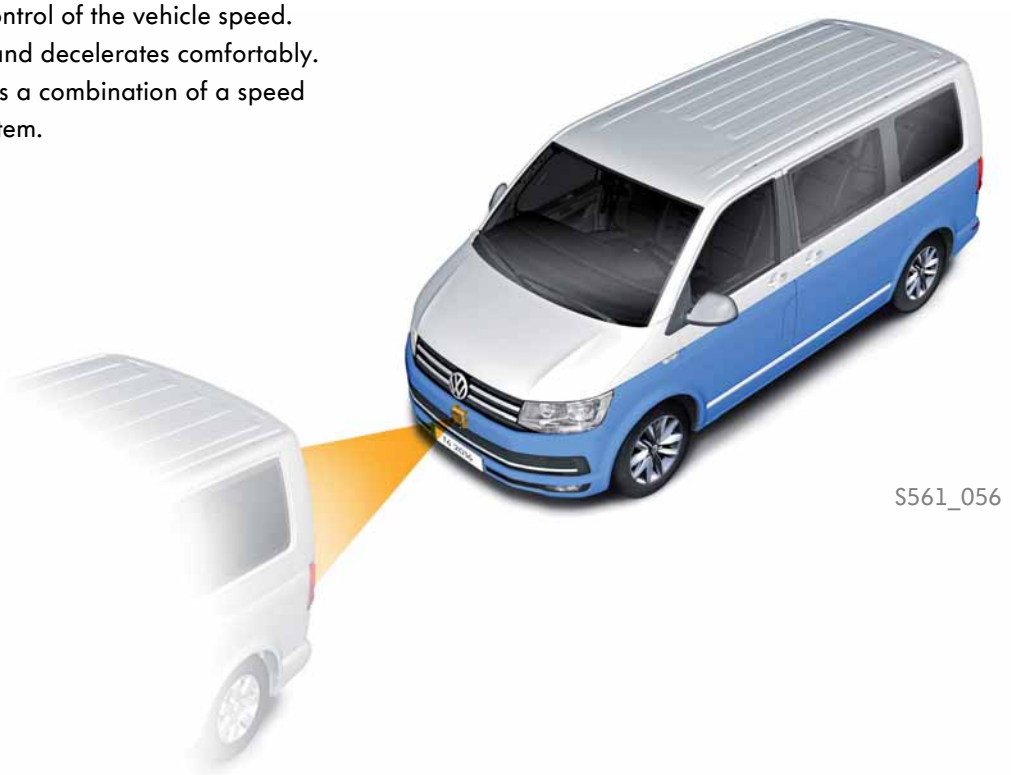
Display

If the lane change assist detects a critical situation, the warning light for lane change assist (LED system) in the exterior mirror housing on the affected side indicates that there is a danger. The system can be switched on and off in the multifunction display. When the ignition is switched on, the warning lights come on briefly once when the lane change assist is switched on and ready to operate. From a speed of 30 km/h onwards, the system automatically switches itself to active mode.

For more information about the lane change assist, please refer to the Self-Study Programmes no. 396 "The lane change assist" and no. 453 "The T5 2010".

Adaptive cruise control (ACC)

Adaptive cruise control (ACC) is a speed control system with intelligent control of the vehicle speed. The system accelerates and decelerates comfortably. Adaptive cruise control is a combination of a speed and distance control system.



S561_056

Structure and function

The radar sensor fitted in the front of the vehicle continuously measures the distance and speed of the vehicle driving in front. Using the ACC controls on the multifunction steering wheel, the system can be activated and deactivated, and the required speed and following distance can be set.
In vehicles with dual clutch gearbox (DSG), braking takes place to a standstill depending on the situation. ACC maintains a preselected speed and a defined distance, accelerating and decelerating automatically. Automatic moving-off is not possible.
The dash panel insert displays all relevant information about the system such as the required speed and warning messages. The driver is solely responsible for the behaviour of the vehicle in all driving situations. He/she can influence the driving situation at any time by switching off the ACC, or braking or accelerating himself/herself. The ACC is subject to system limits during driving. If these limits are reached or exceeded in the driving situation, the driver is informed and presented with a visual message to take over the function.

Operating limits

If the detection capability of the radar sensor is impaired due to heavy rain, snow or dirt, the distance control and speed control are deactivated automatically. The dash panel insert displays "ACC – no sensor function". As soon as the impairment has been rectified, the driver can reactivate ACC control.

Control unit for distance control J428

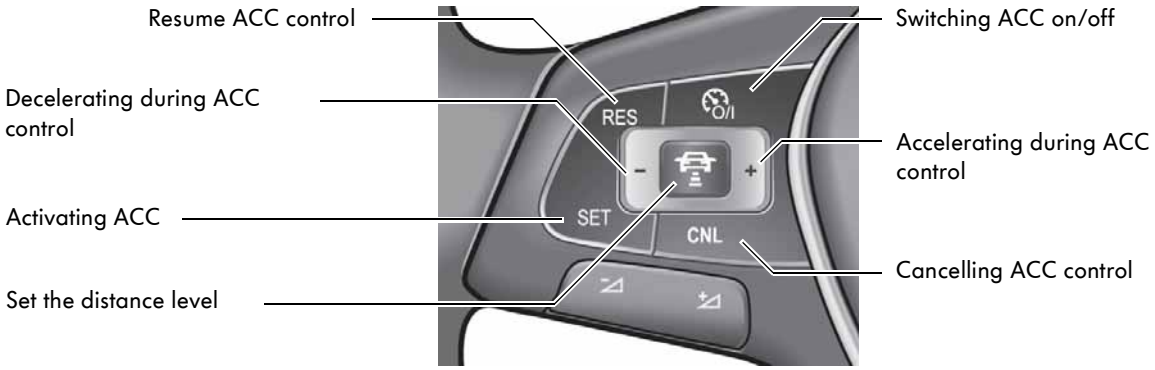
Control unit for distance control J428

S561_051

The control unit for distance control J428 is fitted in the front bumper behind the Volkswagen badge to register the traffic situation in front of the vehicle. The control unit is connected to the powertrain CAN in the T6 2016. A radar sensor is integrated in the control unit. A heater integrated in the sensor surface helps to prevent or reduce a build-up of ice and snow, which otherwise possibly impair the sensor function. The heater is a component of the radar sensor and is activated if the temperature drops below +5 °C.

Operation

Adaptive cruise control (ACC) is operated using the multifunction steering wheel.



S561_057

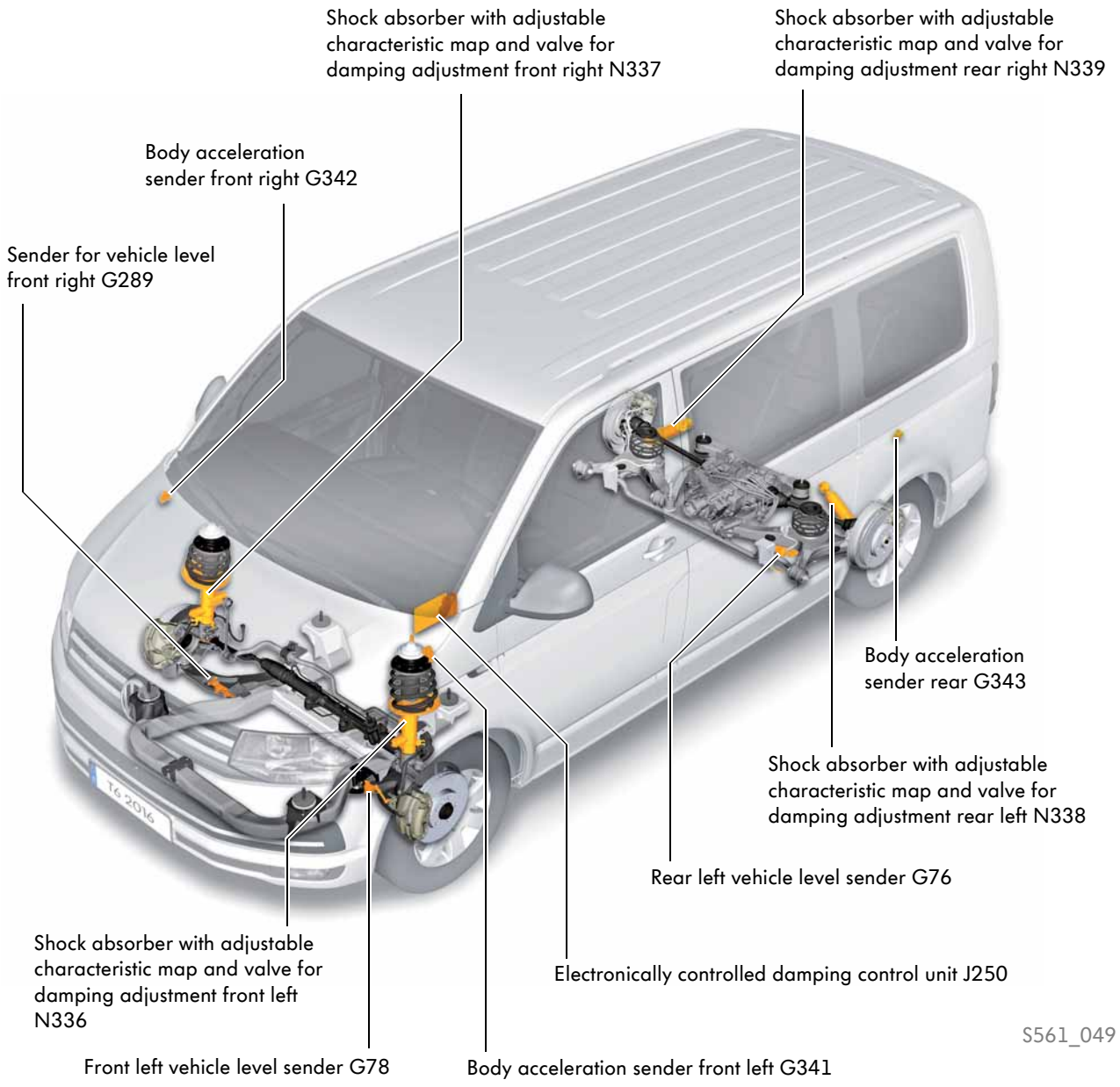
For more information about ACC, please refer to the Self-Study Programmes no. 488 "The Passat 2011"“ and no. 516 "The Golf 2013 driver assist systems".

Dynamic chassis control (DCC)

Dynamic chassis control (DCC) continuously and automatically adjusts the chassis damping during driving to the composition of the carriageway and the particular driving situation. Using the button, the driver can also adjust the damper control for a firmer damper set-up (Sport) or a softer damper set-up (Comfort).

Structure

The components of dynamic chassis control (DCC) include 4 shock absorbers with adjustable characteristic maps, the control unit for electronically controlled damping J250, 3 senders for vehicle level G76, G78 and G289 and 3 body acceleration senders G341 – G343.



Operation

The button for damping adjustment E387 in the dash panel enables the control programmes "Normal", "Sport" and "Comfort" to be selected. The "Sport" and "Comfort" programmes are active when "S" or "C" is lit in the button. The "Normal" programme is active when neither "C" nor "S" are lit in the button. The set programme remains selected even after the ignition has been switched off. The "Normal" setting offers an overall balanced but nevertheless dynamic driving feel. It is highly suitable for everyday use.

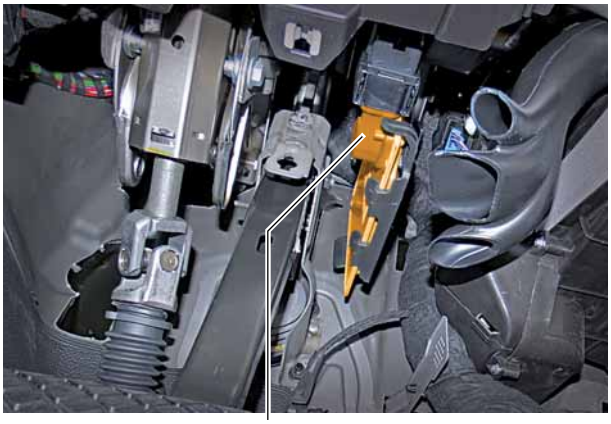
Shock absorber damping adjustment button E387

S561_058

Electronically controlled damping control unit J250

The new processor generation in the control unit for electronically controlled damping J250 ensures control in a one millisecond cycle.

It is fitted under the dash panel above the pedals and connected to the powertrain CAN bus.



Electronically controlled damping control unit J250

S561_159

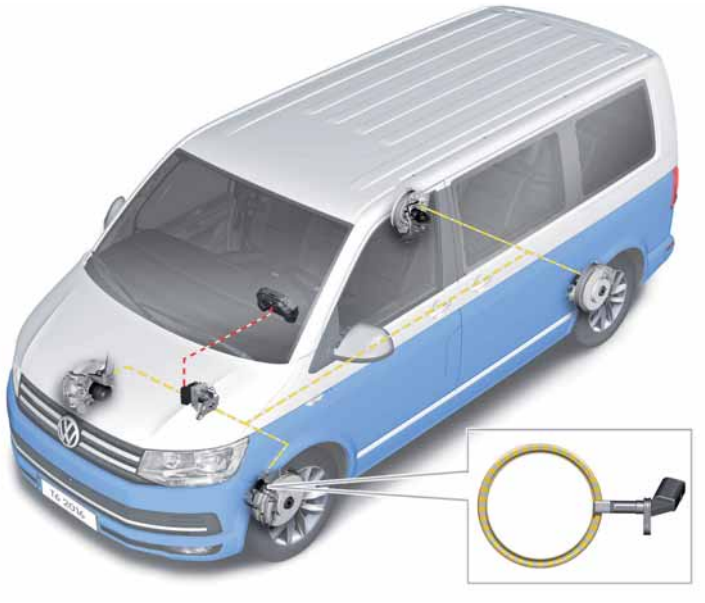
For more information about dynamic chassis control DCC, please refer to the Self-Study Programme no. 406 "The dynamic chassis control DCC".

The tyre pressure monitoring display (RKA+)

Task

The tyre pressure monitoring display (RKA+) uses the wheel speed sensors G44 – G47 to compare the rolling circumference and vibration behaviour of the individual wheels.
The vibration behaviour and the rolling circumference of the wheels change when the tyre pressure changes.

A change in the tyre pressure at one or more wheels is indicated on the tyre pressure monitoring display in the multifunction display on the dash panel insert. No additional sensors are required in the tyres. The change in the tyre pressure is detected by a calculation model in the ABS control unit J104.



S561_101

Function

The tyre pressure monitor display system is part of the software in the ABS control unit J104.
Event memory entries for the tyre pressure monitoring display are stored in the ABS control unit.

The tyre monitor display must have its teach-in process repeated after the following work:

- Change of tyre pressure
- Changing one or more wheels
- Interchanging wheels, e.g. from front to rear

After the teach-in process, the system learns the characteristic parameters of the new pressure and tyre conditions at various speed intervals and stores them.

Changes to the rolling circumference and the vibration behaviour of a wheel are displayed on the dash panel insert by the tyre pressure monitoring display warning lamp K220 lighting up.

The rolling circumference and the vibration behaviour can change due to:

- Insufficient tyre pressure
- Damage to the tyre
- One-sided loading of vehicle
- Influence of snow chains
- Changing a wheel
- Increased load on one axle, e.g. when towing a trailer

The multicollision brake

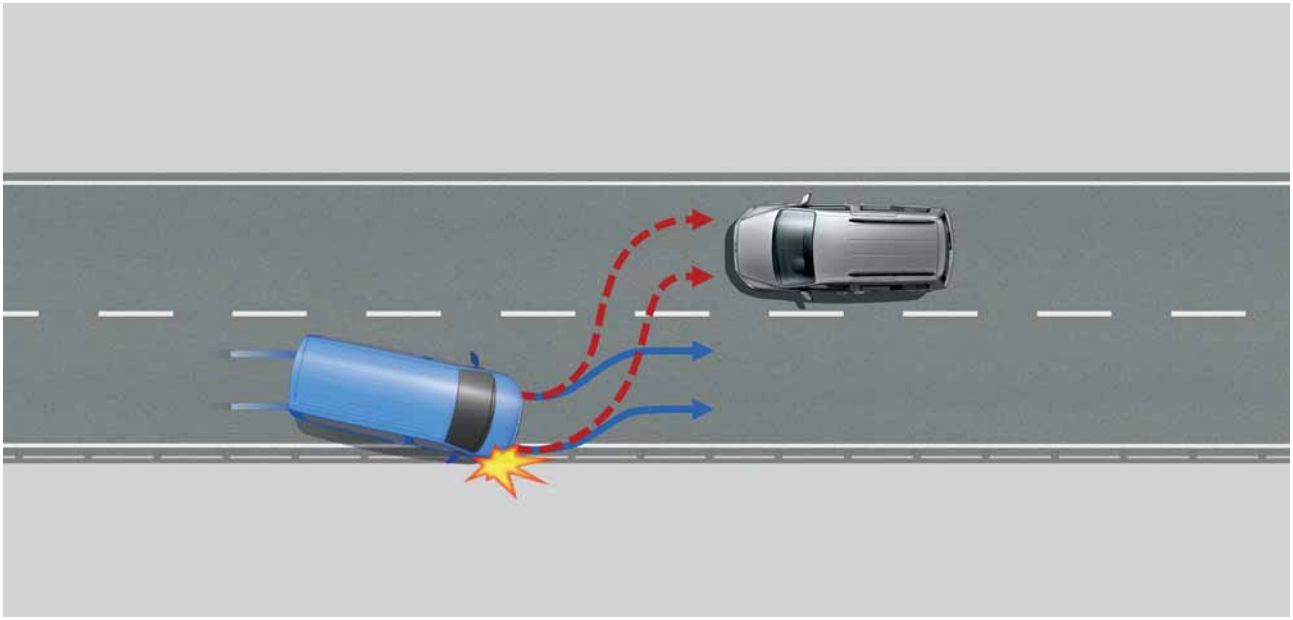
About 22 % of all accidents involving personal injury are multicollisions. Multicollisions are collisions in which the first impact is followed by further collisions, e.g. with side barriers or oncoming traffic.

Function

The multicollision brake triggers automatic brake intervention when a first collision is detected. This automatic braking should prevent follow-on collisions, or at least reduce the impact energy of a follow-on collision. The multicollision brake decelerates the vehicle at maximum 6 m/s^2, at the same time as activating the emergency brake light and the hazard warning lights.
The ESP lamp in the instrument cluster informs the driver about the brake intervention. In all cases, the multicollision brake performs braking down to a vehicle speed of 10 km/h. In this way, the vehicle can remain under the driver's control even after a collision, depending on the accident situation.

To trigger the multicollision brake, the airbag control unit sends a corresponding message to the ABS control unit. Exclusively the sensors of the airbag control unit are used for activating the multicollision brake.

The multicollision brake can be overridden by the driver at any time. If the driver accelerates or presses the brake pedal for an even higher deceleration, the system is overridden.



S561_119

The driver alert system (DAS)

Between and 5 and 25 % of all accidents are caused by fatigue. Driving when fatigued is a cause of more severe accidents than other accident causes.
The driver alert system (DAS) is a convenience function that supports the driver and has a preventative effect by detecting the driver's fatigue level.

Function

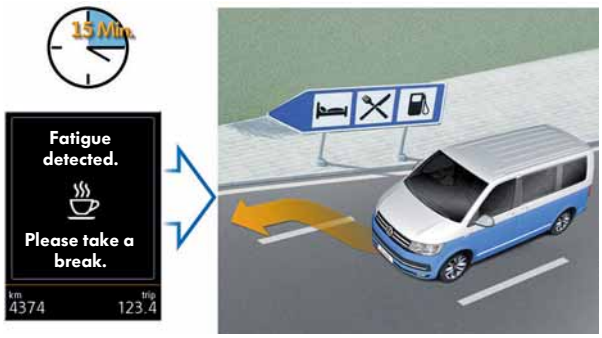
Fatigue is detected by evaluating the steering behaviour. If the system detects that the driver is at risk of falling asleep, there is an acoustic warning as well as a text prompt to take a break displayed on the multifunction display of the dash panel insert.

In addition to the steering behaviour, data regarding the driving situation (vehicle speed, accelerator pedal operation, use of turn indicators, time of day, duration of driving, etc.) and the driver's activity operating the settings and comfort elements (air conditioning system, use of telephone, etc.) are recorded and sent via the CAN bus to the diagnostic interface for the data bus where the data is evaluated. The software is integrated in the gateway.

Operation and display

Operation

Activation and deactivation is via the dash panel insert. The function is available from a speed of 65 km/h onwards. Following activation, the system requires about 15 minutes to collect sufficient data on which to draw a conclusion about the driver's fatigue as driving continues.



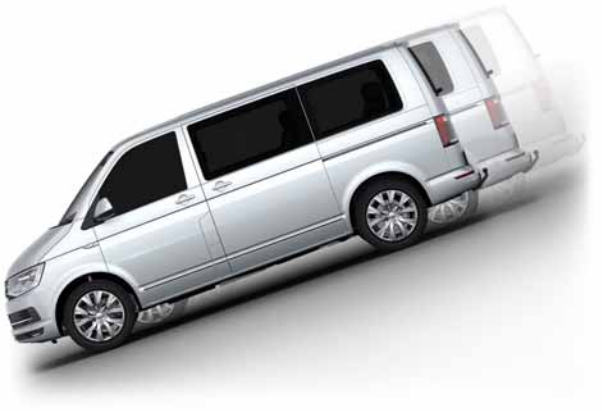
S561_118

Display

If driver fatigue is detected, a message is displayed in the dash panel insert and a gong sounds for 5 seconds. The message and gong are repeated if the driver does not take a break within the next 15 minutes. After this repetition there is no further warning.

Downhill assist function

The downhill assist function makes it easier for the driver to negotiate steep downhill gradients. The downhill assist function maintains the vehicle's speed constant on a downhill gradient without intervention by the driver. The vehicle speed maintained by the downhill assist function depends on the speed of entry to the gradient. This function is implemented by active, controlled braking at all 4 wheels.



S561_120

Operation and display

The downhill assist function is activated using a button in the dash panel, when the ignition is switched on or when driving at a speed less than 30 km/h. Functional readiness is indicated in the dash panel insert if the speed is less than 30 km/h. The display flashes when the downhill assist function is operating the brakes. The following triggering conditions must be met:

- Speed less than 30 km/h
- Driving forwards on a downhill gradient of more than 10%
- Driving in reverse on a gradient of less than 8%
- Engine is running
- Accelerator pedal and brake pedal not pressed

Intervention by the downhill assist function is cancelled or interrupted as soon as one of the following conditions applies:

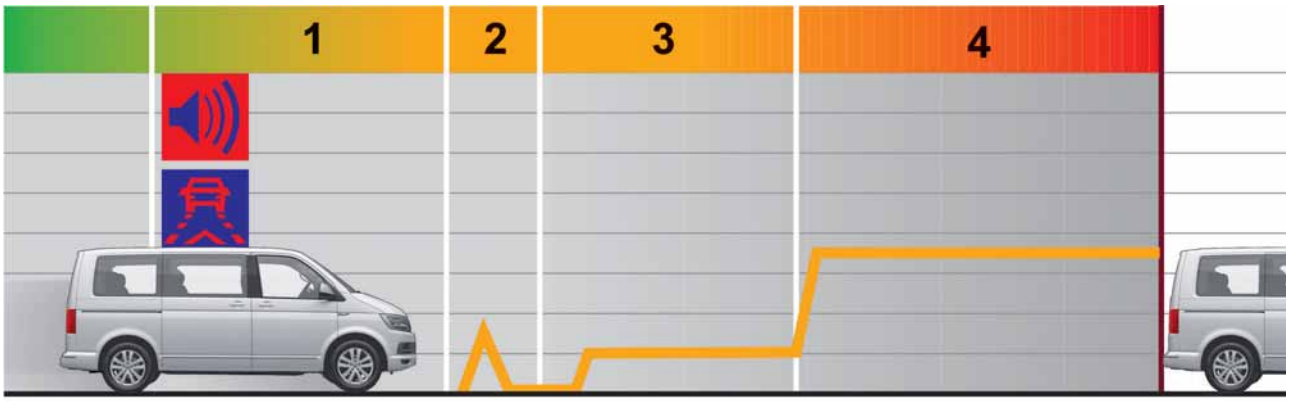
- Speed greater than 30 km/h
- Gradient less than 10%
- Accelerator pedal or brake pedal pressed

S561_121

The area monitoring system (Front Assist)

If the risk of a collision is detected, the brake system is pre-filled. The hydraulic brake assist system is reduced to a lower triggering threshold and the driver is given a visual and audible warning. In addition, an automatic brake jolt alerts the driver to the danger.
If the driver responds with insufficiently powerful braking, the vehicle automatically generates the brake pressure required by the situation.

At a speed of more than 30 km/h, the automatic deceleration is up to 3 m/s^2.
If the driver does not respond to the brake jolt either, Front Assist brakes automatically in order to avoid a collision in the most favourable case, or at least reduce the severity of the accident.



S561_141

1. Advance warning
- Reduction in stopping distance 1:
  - Prefill of the brake, hydraulic brake assist system threshold changeover
- Reduction in stopping distance 2:
  - Visual and audible warning

2. Main warning
- Reduction in stopping distance 1:
  - Hydraulic brake assist system Threshold changeover highest level
- Reduction in stopping distance 2:
  - Brake jolt

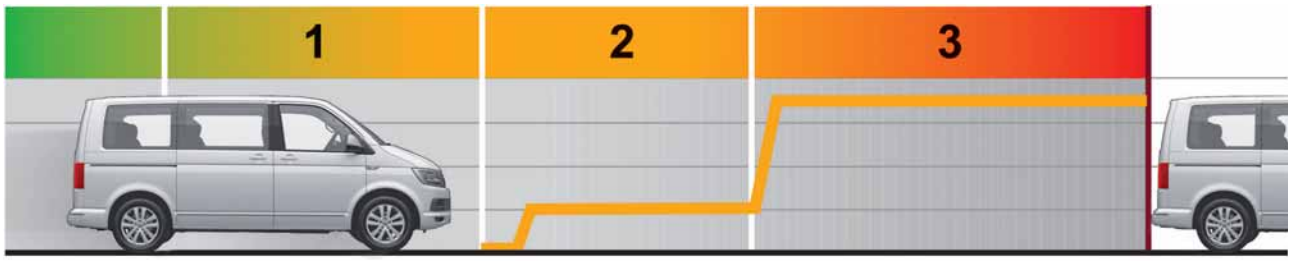
3. Automatic partial braking
- Reduction in stopping distance 3 (5 – 210 km/h):
  - Automatic deceleration, if the driver does not respond (up to 3 m/s^2).
- Reduction in stopping distance 3 (less than or equal to 30 km/h):
  - Automatic deceleration, if the driver does not respond (up to 8 m/s^2).

4. Target braking
- Reduction in stopping distance 3:
  - Boosting of the driver's braking to avoid a collision or reduce the consequences of an accident.

For more information about Front Assist, refer to the Self-Study Programmes no. 470 "The Touareg 2011 – electric/electronic systems" and no. 488 "The Passat 2011".

Automatic emergency braking (AEB)

Automatic emergency braking is an expansion to the Front Assist system, and uses the radar sensor to monitor the area in front of the vehicle. The system operates in the speed range below 30 km/h. If the driver does not respond when there is a risk of a rear-end collision with a vehicle driving or parked in front, the brake system is brought to an increased level of braking readiness, in the same way as with Front Assist. If required, automatic emergency braking automatically triggers full braking to a standstill, in order to reduce the accident severity. The system provides support by applying maximum braking effort if the driver does not press the pedal firmly enough. Like all of these systems, automatic emergency braking cannot release the driver from his/her responsibility for driving the vehicle, and thus cannot be guaranteed to prevent an accident from occurring.



S561_140

1. No driver warning

- Reduction in stopping distance 1:
  - Prefill of the brake, hydraulic brake assist system threshold changeover

2. Automatic partial braking

- Reduction in stopping distance 3 (less than or equal to 30 km/h):
  - Automatic deceleration, if the driver does not respond (up to 8 m/s^2).

3. Target braking

- Reduction in stopping distance 3:
  - Boosting of the driver's braking to avoid a collision or reduce the consequences of an accident.

The proximity alarm

The proximity alarm gives the driver a visual notification if the distance from the vehicle in front is critical (less than 0.9 s). The proximity alarm function uses the radar sensor in the front end to measure the distance to the vehicle driving in front. If the system detects that there is a safety risk, the driver is warned by a corresponding display.
The proximity alarm is active in the speed range from 70 – 210 km/h.

S561_142

Air conditioning

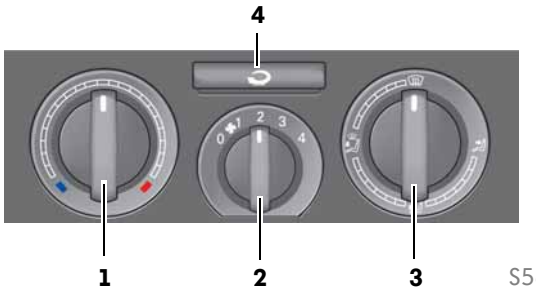
In addition to the manual heating and ventilation system, the T6 2016 is also available with an air conditioning system.
2 versions of the air conditioning system are used:

- Climatic
- Fully automatic 3-zone Climatronic

Control units

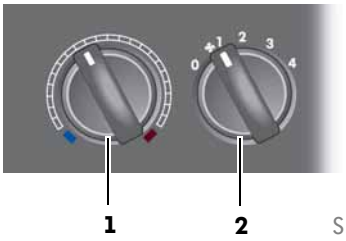
Heating and ventilation system

The heating and ventilation system operates manually using Bowden cables, i.e. adjustment of the temperature flap and air flaps is performed mechanically. The fresh air blower has 5 stages. Changing the warm/cool control on the control unit for the passenger compartment in the dash panel also changes the head/foot air distribution.



S561_025

Controls for the passenger compartment in the dash panel



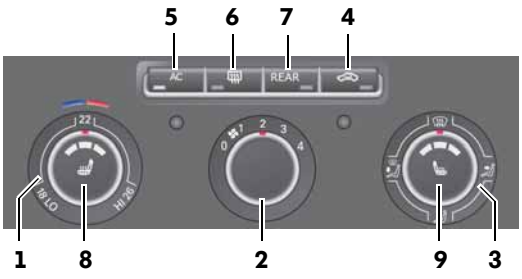
S561_022

Climatic

The climate control system operates manually/electrically. Here, the temperature flap and air flaps are adjusted using control motors. The temperature is controlled fully automatically. The blower stage and air distributing settings are made manually and readjusted manually if required. Like in the heating and ventilation system, the fresh air blower has 4 stages.
Changing the warm/cool control on the control unit for the passenger compartment in the dash panel or in the headliner also changes the head/foot air distribution.

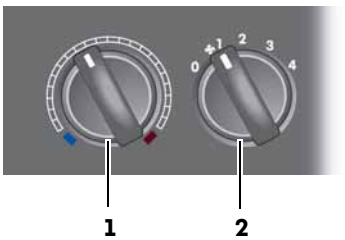
Controls for the passenger compartment:

in the dash panel

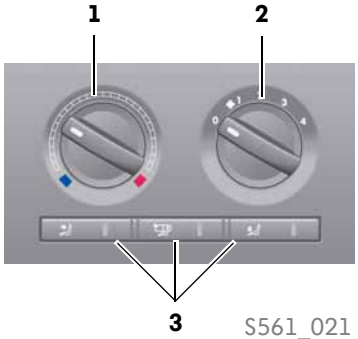


S561_020

in the headliner



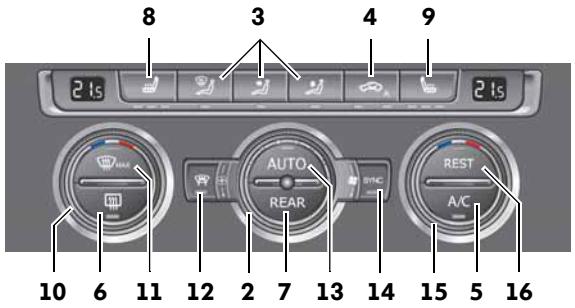
S561_022



S561_021

3-zone Climatronic

In this air conditioning system, temperature requests from 18 °C to 26 °C can be input separately for the driver, front passenger side and passenger compartment. Control is then fully automatic. The illustration shows the control and operating unit for Climatronic in the maximum equipment level.



S561_023

Key to the figures

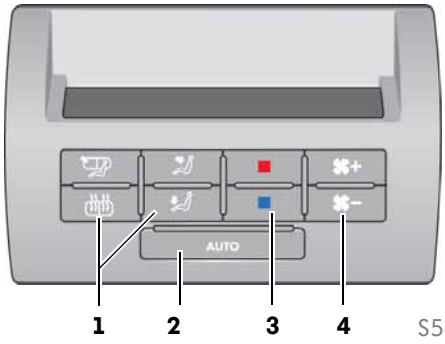
1 Temperature
2 Blower speed
3 Air distribution (in California without side window nozzles)
4 Air recirculation mode
5 Air conditioning system operation
6 Rear window heating
7 Air conditioner regulation for the passenger compartment
8 Seat heating left
9 Seat heating right
10 Temperature left
11 Defrost, windscreen heating as well as maximum blower setting and air distribution towards the windows
12 Heated windscreen
13 Automatic control of the blower, temperature and air distribution depending on the sunshine intensity, outside and inside temperatures
14 Synchronisation of the climate zones to the driver's value
15 Temperature right
16 Use of residual heat when the engine is warm and ignition switched on, used for keeping the interior of the vehicle warm

Depending on the engine load or the load on the electrical system, the power of the Climatic/ Climatronic can be reduced or switched off.

Operating and display unit for Climatronic at rear

Signals are sent from the operating and display unit for Climatronic at rear to the rear control motors. Both operating and display units (front and rear) exchange information via the LIN bus.

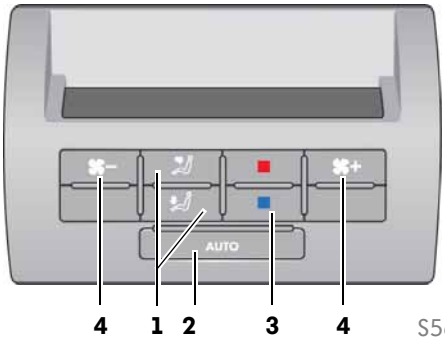
Multivan



S561_024

Controls for the passenger compartment in the headliner at the rear

California



S561_104

Controls above the window between C and D-pillars on the right

Key to the figures

1 Air distribution (in California without side window nozzles)

2 Automatic control of the blower, temperature and air distribution depending on the sunshine intensity, outside and inside temperatures

3 Temperature

4 Blower speed

Auxiliary heater

In the T6 2016, the auxiliary water heater is the Thermo Top Vlies. "Airtronic D3/B3 Plus" is offered as the additional air heater.

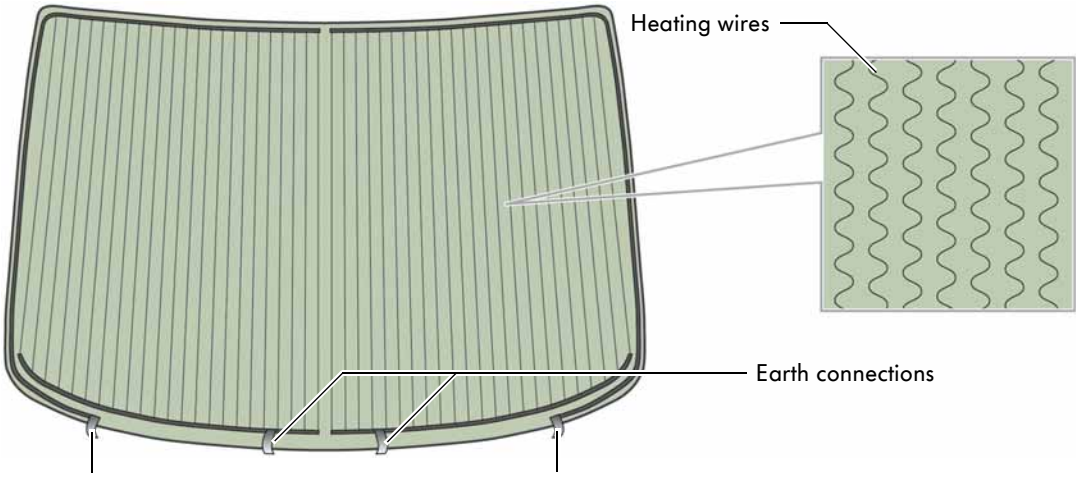
Thermo Top Vlies

S561_105

For more information, refer to the Self-Study programmes no. 453 "The T5 2010" and no. 502 "Thermo Top V and Thermo Top Vlies" auxiliary heaters".

The heated windscreen Z2

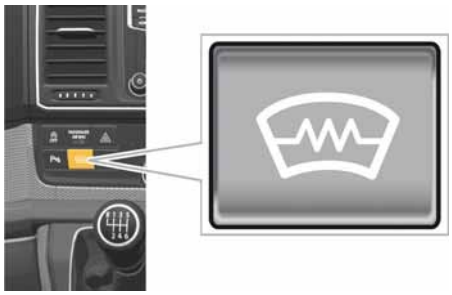
The heated windscreen helps with de-icing the windscreen and only functions when the engine is running.



S561_066

Switching on/off

If a heating and ventilation system or Climatic is fitted, the switch for the heated windscreen is located in the dash panel. The button is connected directly to the onboard supply control unit. If the vehicle has 3-zone Climatronic, the switch is integrated in the Climatronic control unit. The 3-zone Climatronic sends a CAN message to the onboard supply control unit to switch the heated windscreen on and off. This then controls the relay of the heated windscreen. Intervention by the energy management is possible. The windscreen heating remains switched on for about 10 minutes. It can be switched off early by pressing the switch again.
The windscreen heating is switched off when the engine is stopped.



S561_067

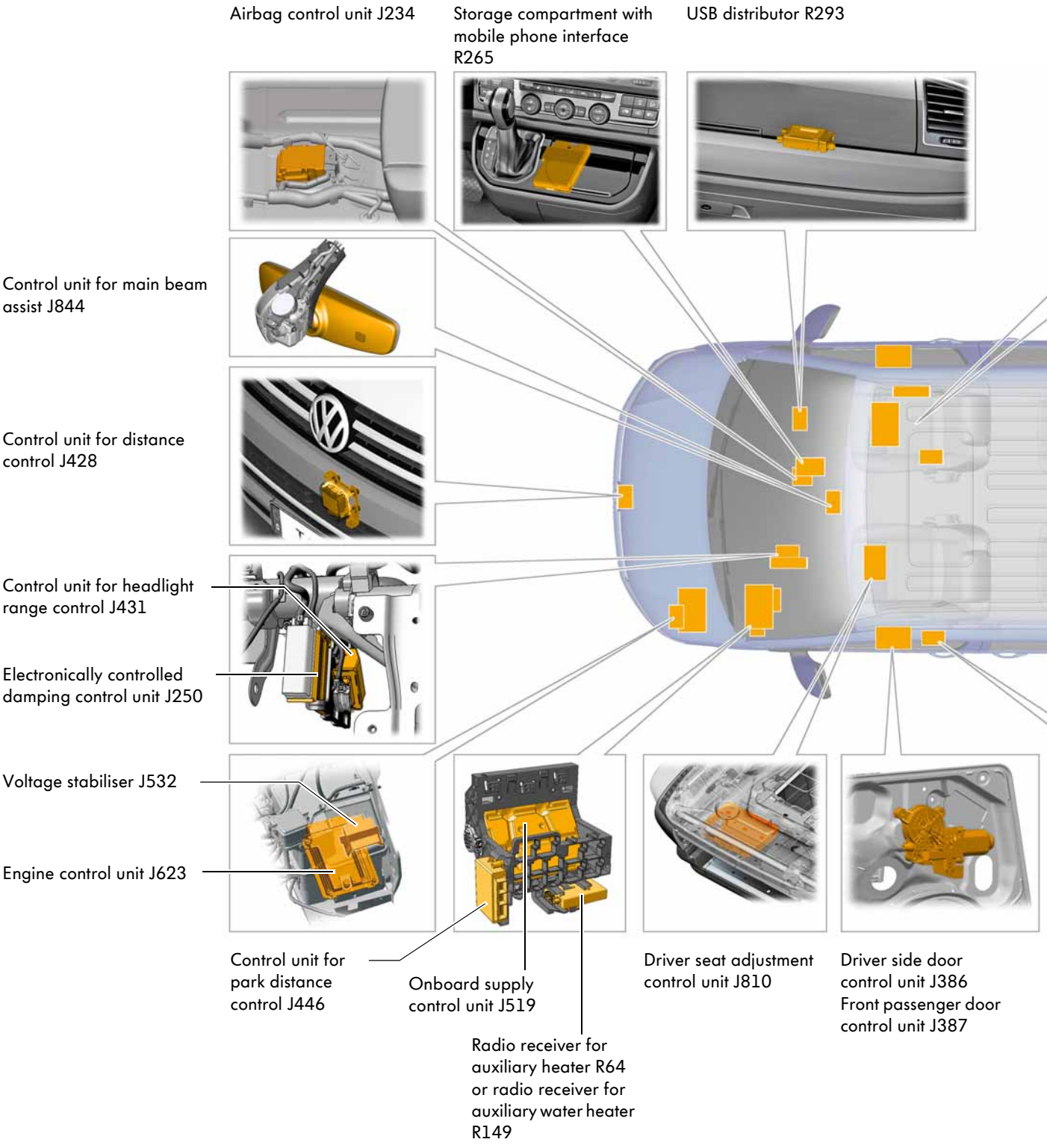
Windscreen heating switch E180
with installed Climatic or heating and ventilation system

S561_068

3-zone Climatronic control unit with switch for heated windscreen E180

The installation locations of the control units (example Multivan)

Some of the control units listed in this overview diagram are optional or country-specific equipment. For reasons of clarity, not all of the control units fitted in the vehicle can be shown.

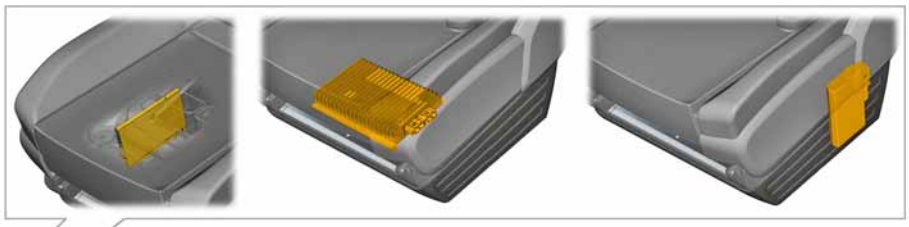


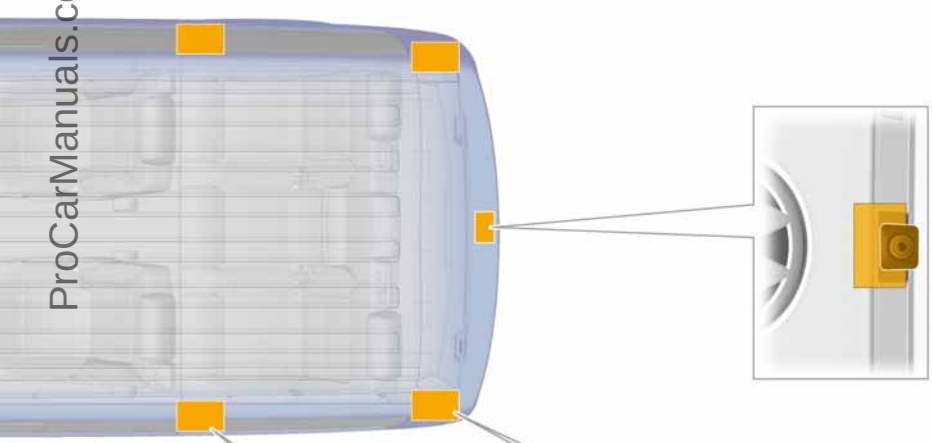
Information about the precise location description of the control units as well as instructions for installation and removal can be found in the current service literature.

Control unit for special vehicles J608

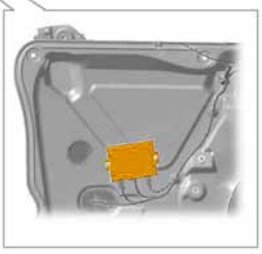
Amplifier R12

Trailer detection control unit J345



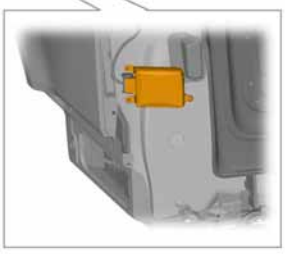


Reversing camera R189



2-way signal booster for mobile phone J984

Left sliding door control unit J558/ right sliding door control unit J731



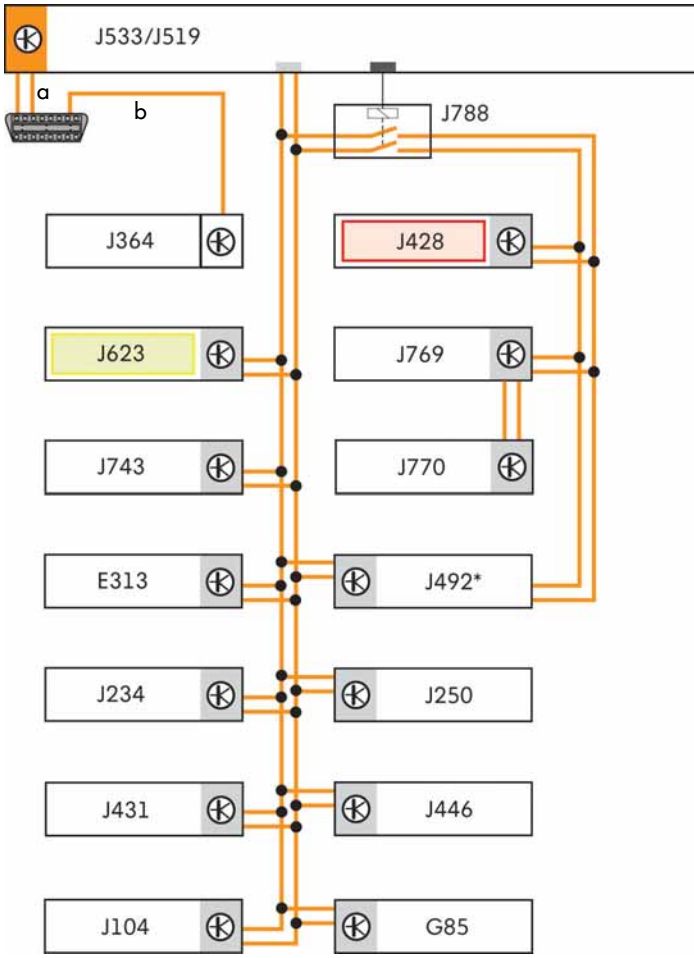
Control unit for lane change assist J769/ control unit 2 for lane change assist J770

S561_158

The networking concept

The networking concept of the T6 2016 is based on that of the T5 2010. Some control units have been added depending on equipment, e.g. for the distance control J428 or for the electronically controlled damping J250.

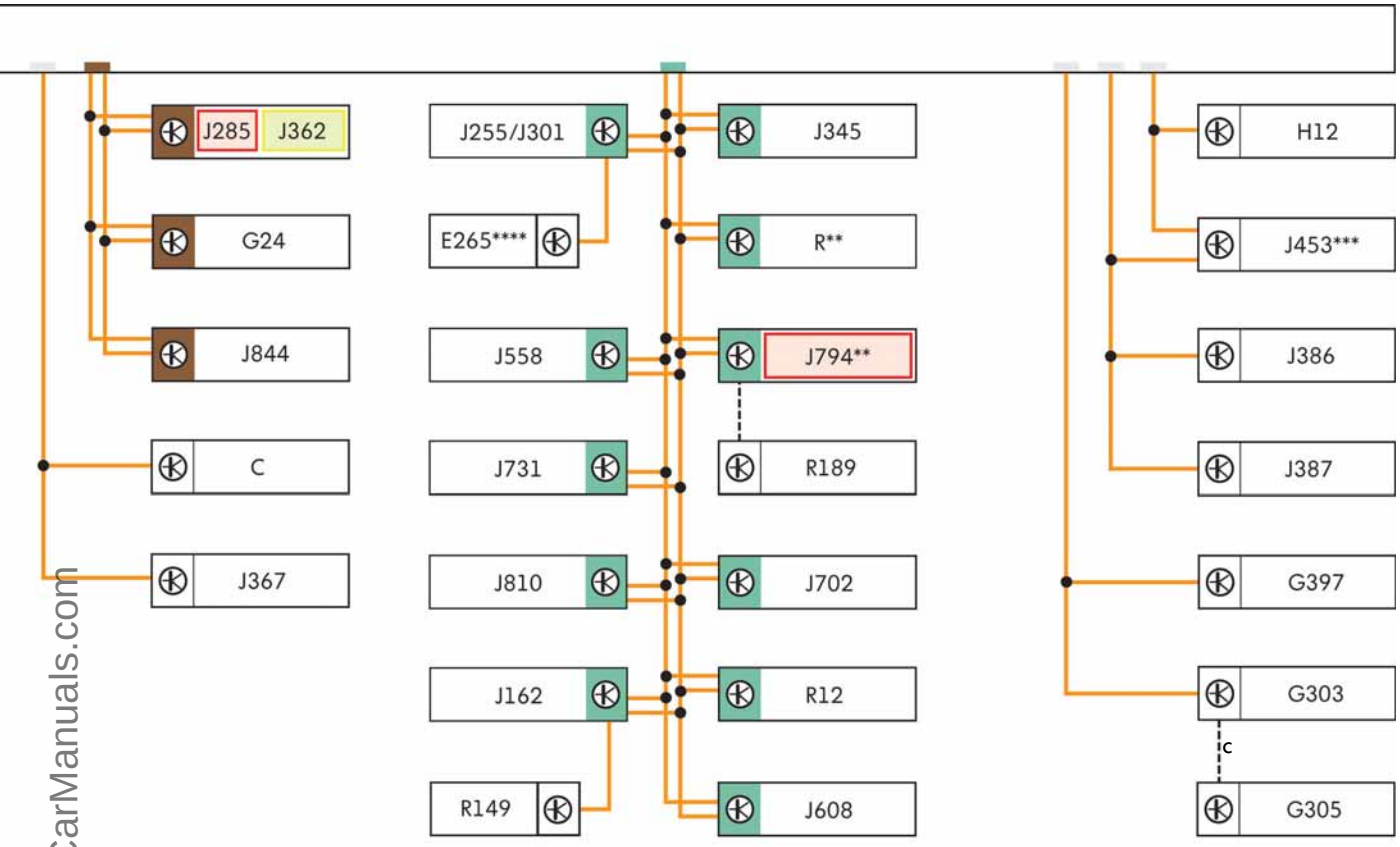
The overview shows all control units that can be connected to the bus systems. Some of the control units shown here are optional or vehicle-specific equipment.



	Powertrain CAN bus
	Convenience CAN bus
	LIN bus
	Dash panel insert CAN bus
	CAN bus line
	LIN bus line
	Immobiliser participant
	Component protection participant
a	CAN bus diagnosis
b	K-wire
c	Data line
*	In vehicles with lane change assist, connected via the wiring harness of the control units for lane change assist J769 and J770.
**	Depending on equipment R or J794 fitted.
***	In equipment with multifunction steering wheel only connected with audio operation via the LIN bus of the door control units J386 and J387.
****	Only fitted with Climatronic.

Legend

C	Three-phase generator
E265	Operating and display unit for Climatronic at rear
E313	Selector lever
G24	Tachograph
G85	Steering angle sender
G303	Transceiver module 1 for internal monitoring
G305	Transceiver module 2 for internal monitoring
G397	Sensor for rain and light detection
H12	Alarm horn
J104	ABS control unit
J162	Heating control unit
J234	Airbag control unit
J250	Electronically controlled damping control unit
J255	Climatronic control unit



S561_033

J285	Control unit in dash panel insert
J301	Air conditioning control unit (Climatic)
J345	Trailer detection control unit
J362	Immobilizer control unit
J364	Auxiliary heater control unit
J367	Battery monitor control unit
J386	Driver side door control unit
J387	Front passenger side door control unit
J428	Control unit for distance control
J431	Control unit for headlight range control
J446	Control unit for park distance control
J453	Multifunction steering wheel control unit
J492	Four-wheel drive control unit
J519	Vehicle electrical system control unit
J533	Data bus diagnostic interface
J558	Left sliding door control unit
J608	Control unit for special vehicles
J623	Engine control unit
J702	Display unit for roof
J731	Right sliding door control unit
J743	Mechatronic unit for dual clutch gearbox
J769	Control unit for lane change assist
J770	Control unit 2 for lane change assist
J788	Disconnection relay for powertrain CAN bus
J794	Control unit 1 for information electronics
J810	Driver seat adjustment control unit
J844	Control unit for main beam assist
R	Radio
R12	Amplifier
R149	Radio receiver for auxiliary water heater
R189	Reversing camera

The dash panel insert

A new generation of dash panel inserts is fitted in the T6 2016. The dash panel inserts contain the immobiliser control unit J362. There are 3 different variants depending on equipment:

- Dash panel insert with multifunction display (MFD)
- Instrument cluster with multifunction display MFD Plus
- Instrument cluster with MFD Premium

With MFD

This variant has a black/white segment display with a maximum of 480 display segments.
A loudspeaker for playback of warning signals is integrated in the instrument cluster. The time can be set or the trip recorder reset using adjustment buttons.

S561_036

With MFD Plus

This variant has a black/white TFT display as MFD with a dot matrix of 110 x 166 pixels.
Compared to the instrument cluster with MFD, it has an advanced display possibility as a precondition for fitting various equipment items such as driver assist systems.

S561_037

With MFD Premium

This variant has a colour TFT display with a dot matrix of 320 x 240 pixels.
It can display 16.7 million colours. The MFD Premium can also display elaborately animated picture transitions in comparison to MFD Plus, such as are required for the lane recommendations of the navigation system.

S561_038

The multifunction steering wheel

Depending on the equipment variant of the vehicle, the optionally available multifunction steering wheel is available in three variants for the market launch of the T6 2016. If no multifunction steering wheel is fitted in the vehicle, the available functions are operated using buttons on the left and right steering column levers.
Depending on the equipment an engine, the buttons and switches for operating the cruise control system (CCS) may be fitted in the turn indicator and main beam levers.

Variant 1

This variant has the controls for the multifunction display (MFD), audio and telephone. The left-hand steering wheel spoke carries the control buttons for controlling the audio output, while the right-hand spoke carries the buttons for controlling the MFD in the dash panel insert and the telephone.
If this multifunction steering wheel is fitted, the corresponding buttons are not fitted on the steering column lever for the MFD operation.

S561_062

Variant 2

This variant has the controls for MFD, audio, telephone and cruise control. The left-hand steering wheel spoke carries the control buttons for controlling the cruise control system, while the right-hand spoke carries the buttons for controlling the MFD in the dash panel insert and the telephone. Audio output is controlled using the buttons recessed downwards on both steering wheel spokes.

S561_027

Variant 3

In this variant, the controls for MFD, audio, telephone, cruise control and ACC are included. The left-hand steering column spoke carries the operating buttons for controlling the cruise control and ACC. Changing over between the two driver assist systems is performed using the MODE button. The right-hand steering wheel spoke carries the operating buttons for controlling the MFD in the dash panel insert and the telephone. Audio output is controlled using the buttons recessed downwards on both steering wheel spokes.

S561_028

The headlights

The exterior design and internal structure of the T6 2016 headlight unit has been adapted to the current design language at Volkswagen Commercial Vehicles. The headlight units have a clear glass structure and are fitted in the H4, H7 and LED headlight variants depending on equipment.

Headlight module H4

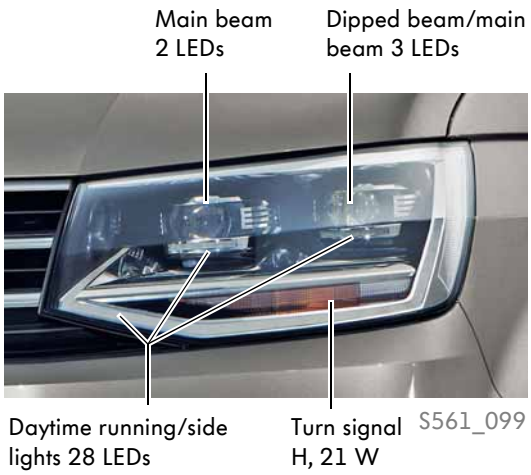
This headlight module has an H4 bulb for the dipped and main beams.
As standard, the headlights are equipped with a daytime running light.

Headlight module H7

This headlight unit has one H7 bulb each for the dipped beam.
As standard, the headlights are equipped with a daytime running light.

Headlight module LED technology

The light functions are provided by LEDs, except for the turn signal. One bulb is used for the turn signal.



The tail light clusters

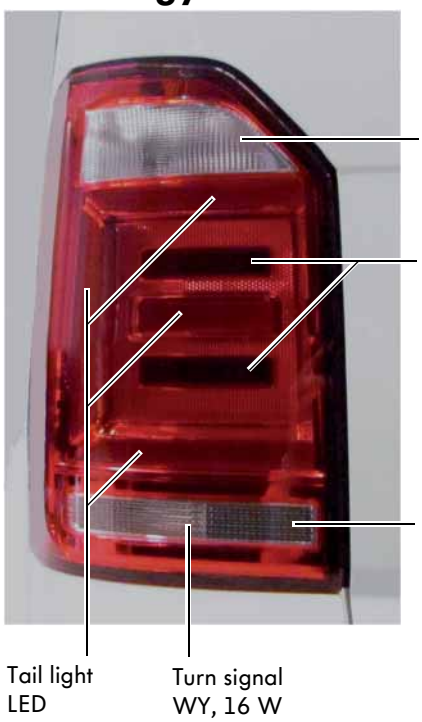
Vehicles with wing doors

S561_042

Vehicles with tailgate

S561_115

Tail light clusters with LED technology



S561_041

Fog lights/cornering light

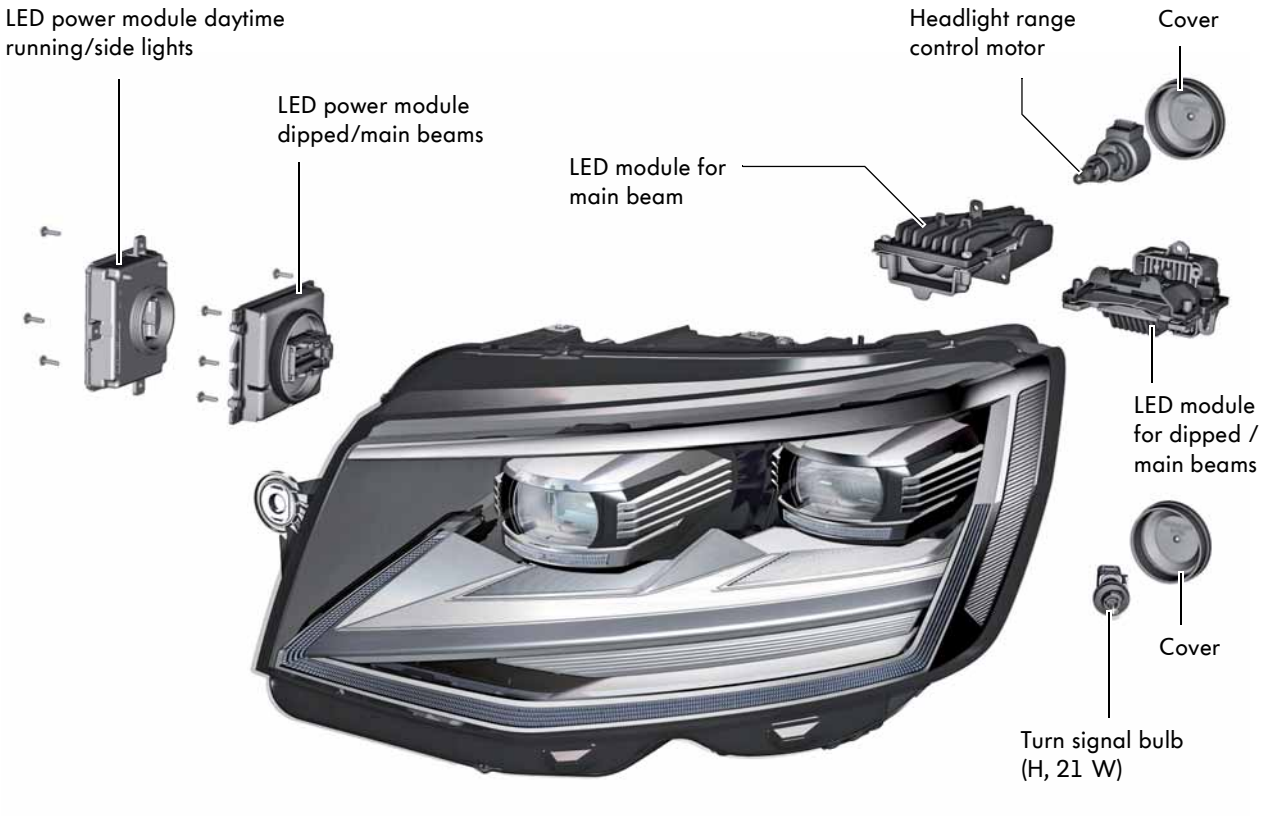
The fog lights are each equipped with one H11-55 W bulb.

If a static cornering light is fitted, the fog light on the inside of the corner is switched on depending on the speed, up to 40 km/h, and if the lighting system is switched on and the steering wheel is turned or a turn signal is activated. This provides better illumination of the edge of the road on the inside of the corner.

S561_100

The LED headlights

The LED headlight module includes the following components, amongst others:

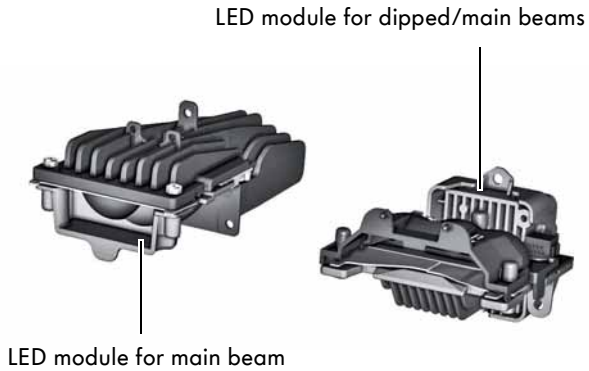


S561_089

LED module for dipped beam or main beam

2 LED output modules are arranged in the headlight for the dipped beam and main beam. The functions are controlled by the LED output module for dipped beam and main beam.

The base for the LED module is a heat sink on which the LED circuit boards are firmly attached. A fan is used on the LED module for dipped beam/main beam to provide active cooling of the LEDs; the speed of the fan can be adjusted according to temperature.



S561_095

During repairs, the LED modules can be renewed individually. Please also refer to the current workshop manuals, because the LED modules will require precision adjustment.

Headlight functions

Daytime running lights/side light

The daytime running light as well as the side lights are achieved by 20 white light-emitting diodes in the lower area and two short light strips with 4 LEDs each on the LED modules. The LEDs are dimmed for the side lights function.

S561_090

Dipped beam

The dipped beam comprises the outer LED module. The LEDs of the daytime running light are dimmed at the side light level.

S561_091

Main beam

In the main beam function, the inner LED module is activated in addition to the LED module of the dipped beam. The main beam is activated by the main beam lever or the main beam assist.

S561_092

Headlight flasher

In the headlight flasher, only the inner LED module provided for the main beam function is activated.

S561_093

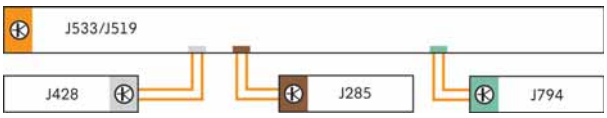
Turn signal

The turn signal is provided by an H-21W bulb arranged behind an orange lens.

S561_094

The component protection

The T6 2016 has component protection for various control units. This is intended to prevent an unauthorised exchange of components. The control unit in the dash panel insert J285 is the master for component protection.



S561_103

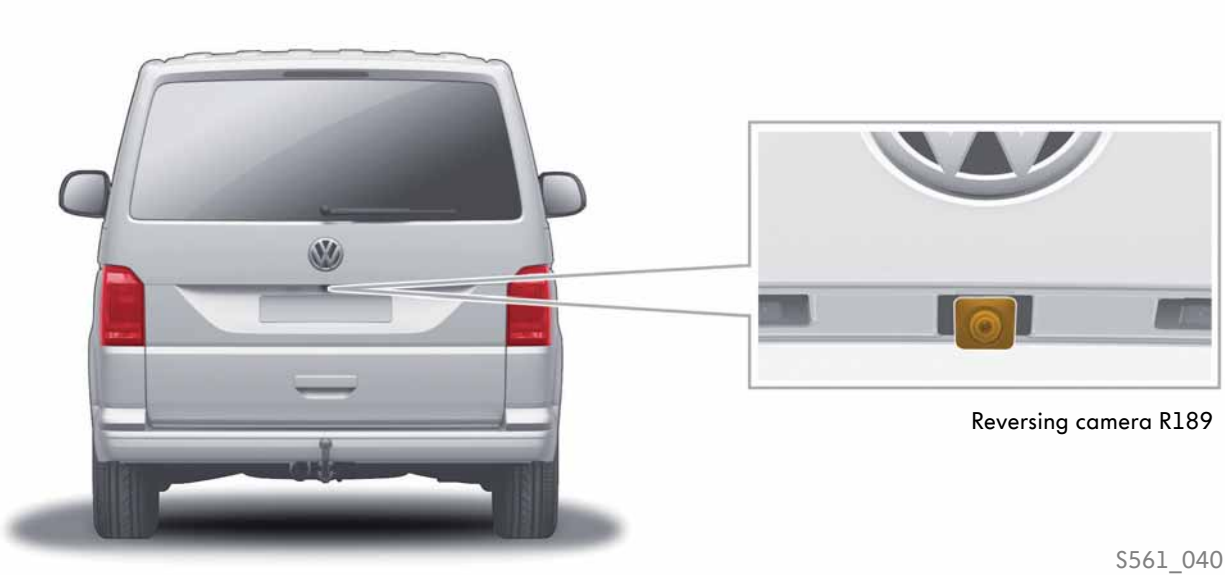
In addition to the stated control unit, the control unit for distance control J428 and the control unit 1 for information electronics J794 also participate in component protection. The participants in the component protection are checked when terminal 15 is switched on. If the comparison result is negative, the corresponding component blocks its function partially or entirely and stores this in the event memory. The component protection function must then be enabled online with the vehicle diagnostic tester.

For more information about component protection, refer to Self-Study Programme no. 517 "The Golf 2013 electric".

The reversing camera R189

Installation location

In the T6 2016, the reversing camera R189 is used and improves visibility to the rear when reversing. It is attached to the tailgate above the number plate, and supplies a real video image of the area behind the vehicle. The reversing camera can be combined with the following radio navigation systems: Composition Colour, Composition Media and Discover Media.



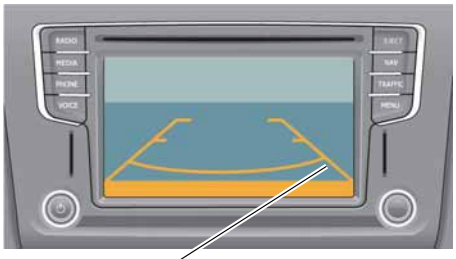
Reversing camera R189

S561_040

Radio display

When terminal 15 is on and reverse gear engaged, the video signal from the camera is shown on the screen.
The screen shows the real video image. The static help lines that overlay the surrounding picture in the colour display are applied by the screen and are used for gauging distances better. The reversing camera R189 does not require calibration.

Discover Media display example



S561_046

Static lines

Radio, telephone and navigation

The radios and navigation systems

A new generation of radios and navigation systems is launching in the T6 2016 and Caddy 2016 for Volkswagen Commercial Vehicles. They set new standards in terms of operation and connection possibilities for external devices. All devices can be combined with a provision for mobile telephone.

S561_136

The following devices are available:

- Composition Audio radio
- Composition Colour radio
- Composition Media radio
- Discover Media navigation system

The Car-Net

For the first time, Volkswagen Commercial Vehicles is presenting mobile online services, also referred to as Car-Net. This involves using online data for certain applications, which are referred to as services. These can be provided for various application areas.

S561_137

The following services are currently available:

- **Guide & Inform** (improved navigation and infotainment)
- **App Connect** (smartphone connections and apps)
- **Media Control** (infotainment expansions via app)

For more information about the radios and navigation systems as well as Car-Net, refer to Self-Study Programme no. 562 "Infotainment and Car-Net in T6 2016 and Caddy 2016".

Notes

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❀ This paper was manufactured using pulp bleached without the use of chlorine.