

Self-Study Programme 298

The Touareg Electrical System

Design and Function



Vehicles with off-road capability are no longer just utility vehicles for a limited group of people.

At all levels in the population they are now becoming more and more sought after.

The off-road vehicle features a number of hi-tech convenience systems for improved comfort.

This Self-Study Programme is designed to help you learn about the electrical and electronic systems in the Volkswagen Touareg.



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NEW





Important Note

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Fuse boxes and relay slots in vehicle's electrical system

Fitting locations

The fuse boxes and relay slots can be found at various locations in the vehicle due to the fact that the onboard power supply does not have a central layout.

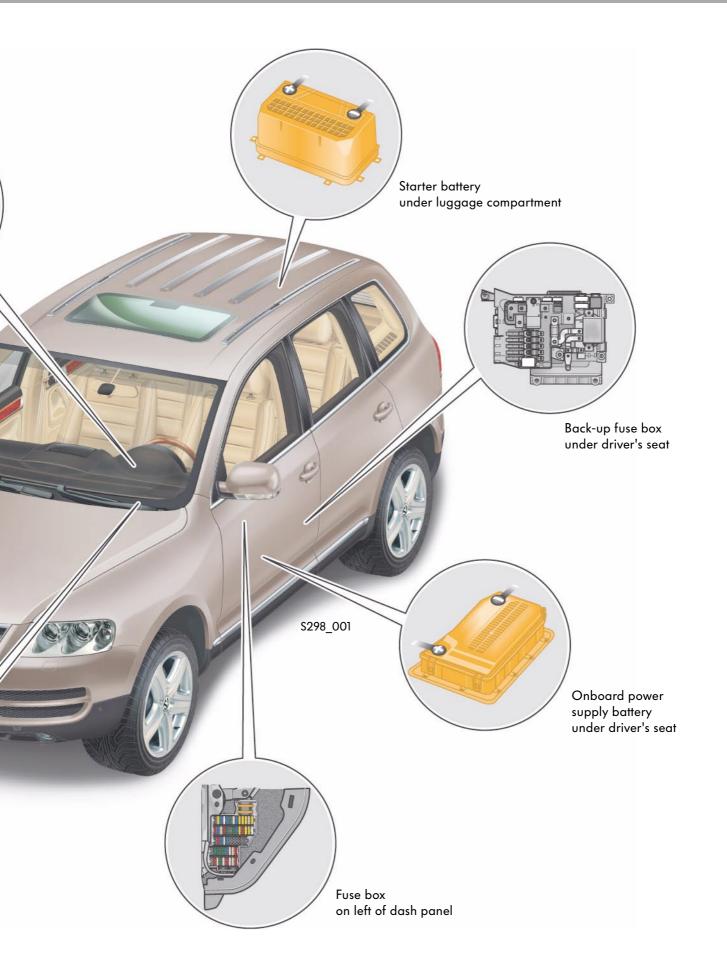
The illustrations here provide an overview of their fitting locations.





More detailed information can be found in the electronic service information system (ELSA).







The data bus network

Networking

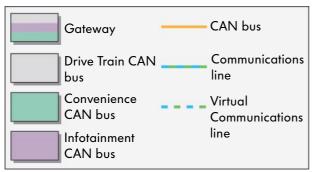
In order that the control units can exchange information between each other, they are connected in a network via the Gateway in the dash panel insert J285.

The data exchange allows the control units to access various kinds of information in the vehicle. The more information a control unit has about the current driving situation, the greater the level of safety and comfort.

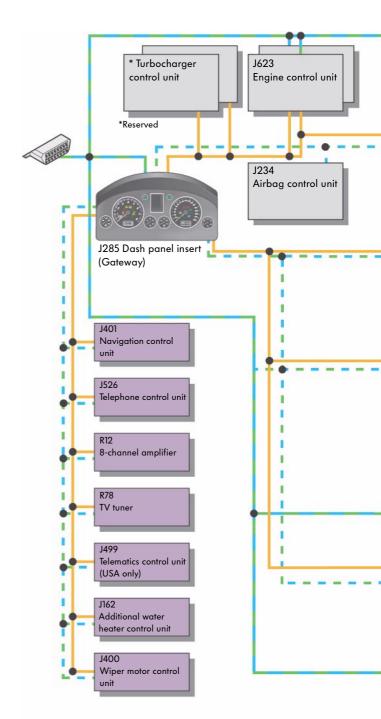
To ensure the exchange of data can take place, the control units are connected together in a network via a CAN bus system. Due to reasons of safety and because the data bus systems work at different rates of transfer, the control units are allocated to different CAN bus systems. If one data bus system should fail, the others can continue to function.

The CAN bus systems are separated as follows

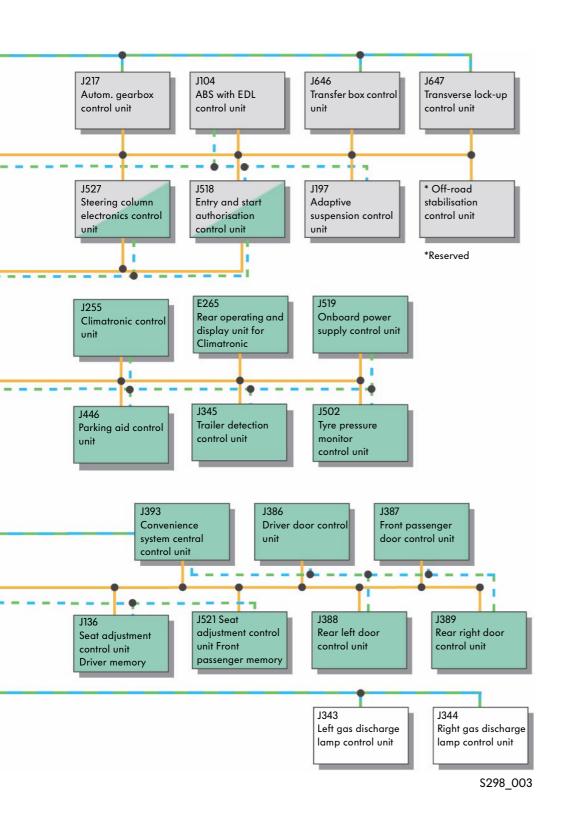
- Drive Train CAN bus,
- Convenience CAN bus,
- Infotainment CAN bus.



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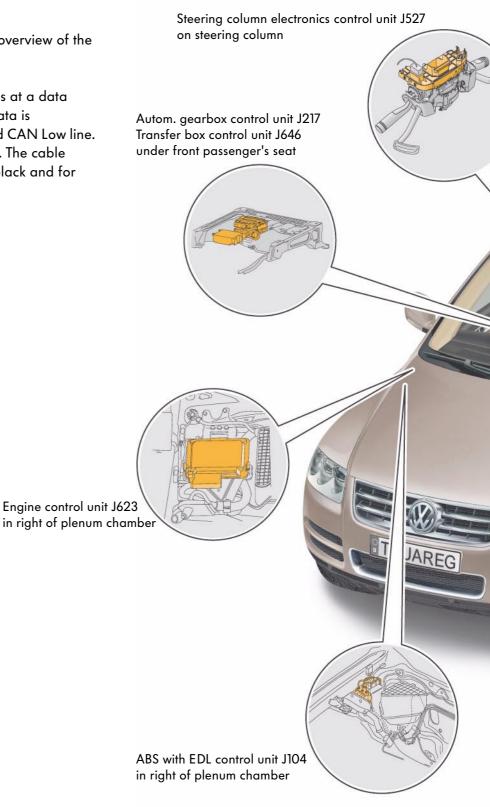


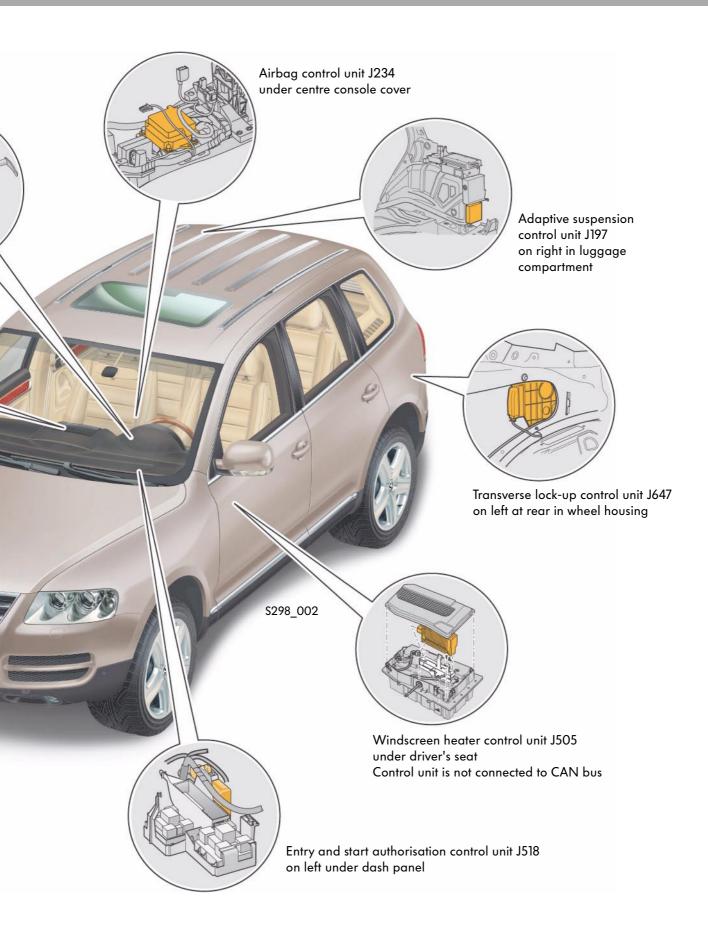
The control units in the Drive Train CAN bus

Control units

The illustrations here provide an overview of the fitting locations.

The Drive Train CAN bus operates at a data transfer rate of 500 kbit/s. The data is transmitted via the CAN High and CAN Low line. Both wires are entwined together. The cable colour for CAN High is orange/black and for CAN Low it is orange/brown.









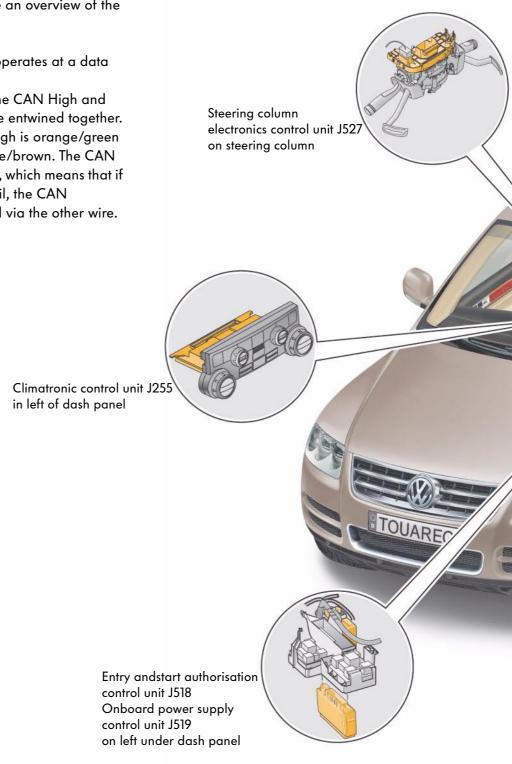
The Drive Train CAN bus control units

Control units

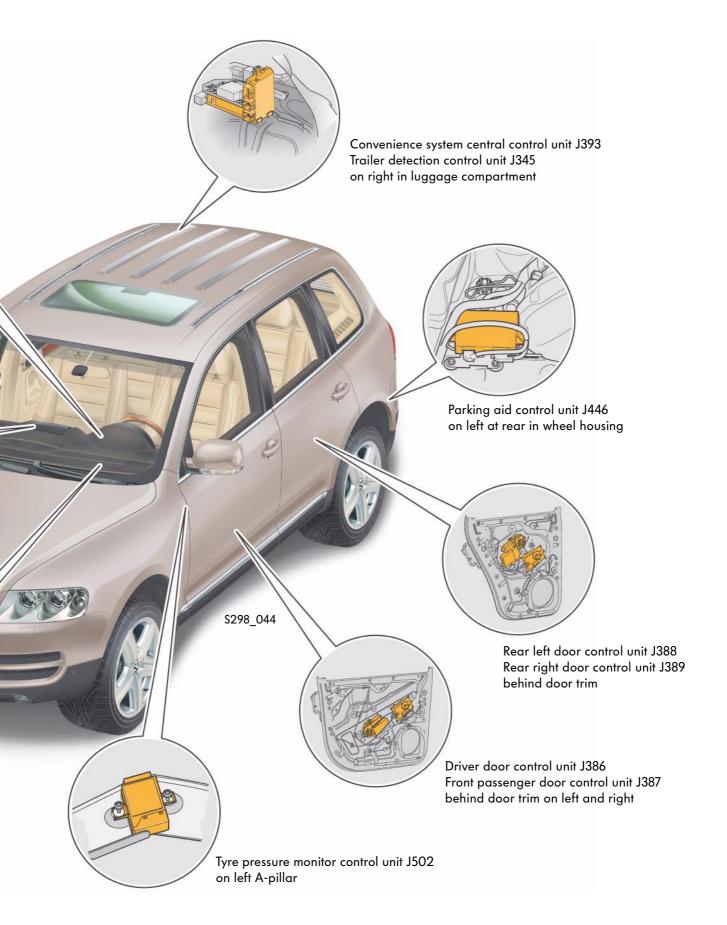
The illustrations here provide an overview of the fitting locations.

The Convenience CAN bus operates at a data transfer rate of 100 kbit/s.

The data is transmitted via the CAN High and CAN Low line. Both wires are entwined together. The cable colour for CAN High is orange/green and for CAN Low it is orange/brown. The CAN bus is single wire compatible, which means that if one CAN bus wire should fail, the CAN messages can be transmitted via the other wire.









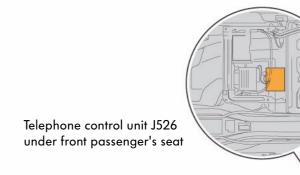
The Infotainment CAN bus control units

Control units

The illustrations here show the fitting locations of the control units for the Infotainment CAN bus.

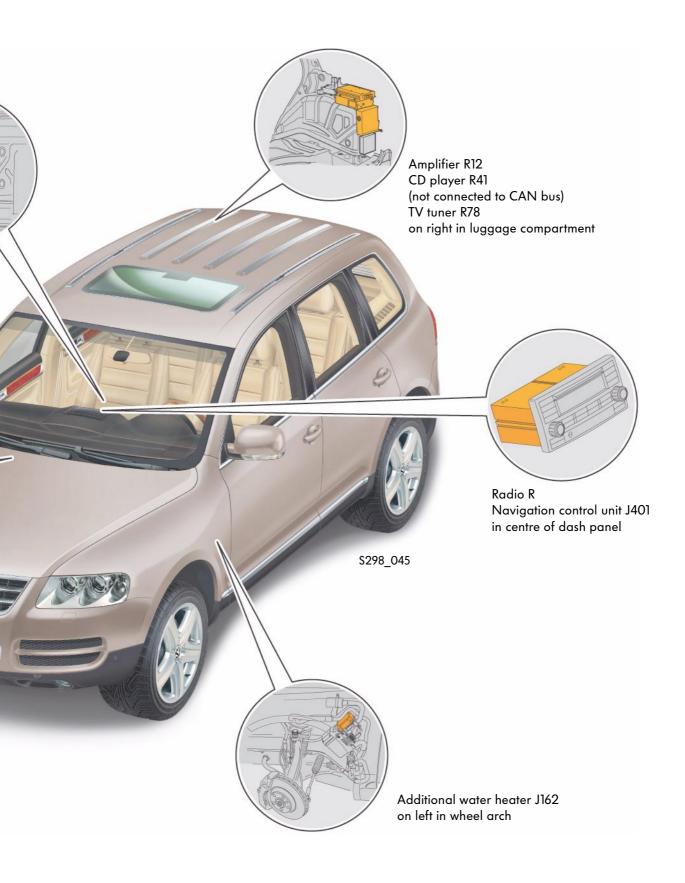
The Infotainment CAN bus operates at a data transfer rate of 100 kbit/s.

The data is transmitted via the CAN High and CAN Low line. Both wires are entwined together. The cable colour for CAN High is orange/violet and for CAN Low it is orange/brown. The Infotainment CAN bus is single-wire compatible, which means that if one wire fails, data can be sent and received via the other wire.









Onboard power supply

The fuse and electrical boxes

The fuse boxes can be found in the dash panel on the left and right-hand side.

The back-up fuse box is under the driver's seat and the E-boxes can be found on the left in the plenum chamber and under the dash panel.

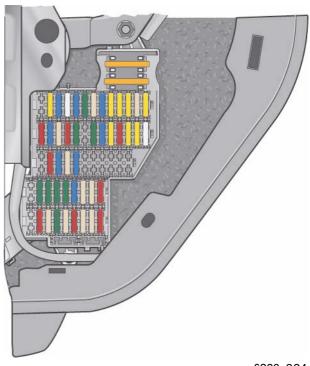


Fuse box on left of dash panel

The fuse box on the left of the dash panel, for example, houses the fuses for the following control units:

- Onboard power supply control unit
- Entry and start authorisation control unit
- Tyre pressure monitor control unit
- Engine control unit
- Airbag control unit
- ABS with EDL control unit
- Steering column electronics control unit
- Convenience system central control unit
- and fuses for other electrical consumers

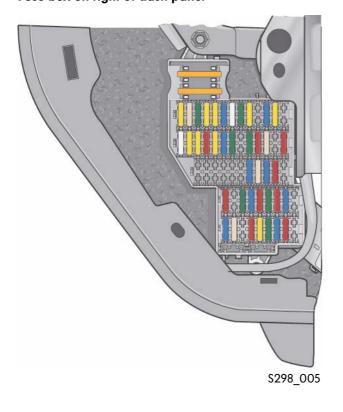
Fuse box on left of dash panel



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Fuse box on right of dash panel



Fuse box on right of dash panel

The fuse box on the right of the dash panel houses the following fuses:

- Trailer detection control unit
- Parking aid control unit
- Telephone control unit
- ABS with EDL control unit
- Navigation control unit
- CD changer
- TV tuner
- Radio
- Radio amplifier
- Convenience system central control unit
- Adaptive suspension control unit
- Automatic gearbox control unit
- Convenience system central control unit
- Telephone
- and fuses for other electrical consumers



The exact fuse allocation can be found in the electronic service information system (ELSA).

Onboard power supply

Back-up fuse box under driver's seat

The following fuses and relays can be found in the back-up fuse box:

Fuses:

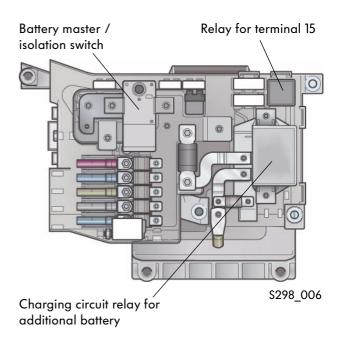


- Fuse sockets
- Fuse for terminal 15 relay
- Battery parallel circuit relay
- F-socket
- Fuse for onboard power supply control unit
- Starter lead diagnosis
- Fuse for adaptive suspension, compressor

Relays:

- Battery master / isolation relay E74
- Relay for terminal 15
- Charging circuit relay for vehicles with dual battery electrical system

Back-up fuse box under driver's seat

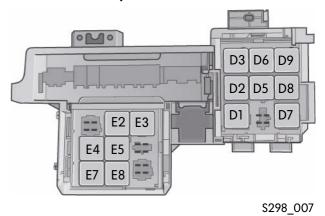


E-box under dash panel

The following relays can be found in the E-box:

-	Servotronic relay	D1
-	Relay for tailgate closing aid	D2
-	Relay for adaptive suspension compressor	D3
-	Relay for power supply terminal 15	D5
-	Relay for additional water heater	D6
-	Relay for heated rear windscreen	D7
-	Relay for seat heating	D8
-	Additional relay for brake lights	D9
-	Relay for spare wheel	E2
-	Relay for manual air-conditioning system	E3
-	Relay for circulation pump	E4
-	Relay for start-up consumers	E5
-	Relay for headlight washer system	E7
-	Relay for residual warmth	E8

E-box under dash panel



E-box on left of plenum chamber

The allocation of the fuses and relays is dependent on the engine type. This layout is specific to the AZZ engine and is shown here for demonstration purposes only.

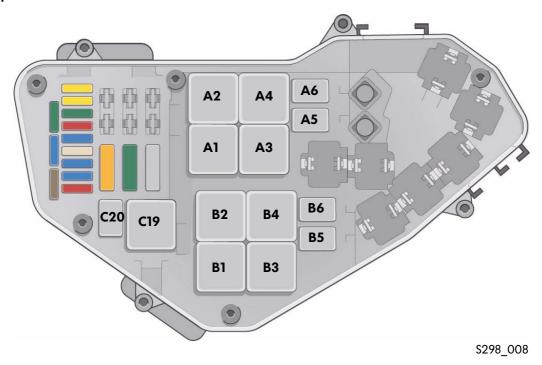
Fuses:

- Fan
- Secondary air pump
- Injectors
- Engine control unit, variable camshaft timing, intake manifold changeover valve, thermal heating
- Leak diagnosis of fuel tank,
 high pressure sender for air conditioning,
 radiator fan control unit

Relays:

-	Terminal 30 power supply	A1 / A3
-	Secondary air pump	A4
-	Additional coolant pump	A5
-	Fuel pumps	A6 / C19
-	Terminal 50 power supply	C20

E-box in plenum chamber





Fuse boxes will vary depending on the vehicle and engine type. For precise details on the fuse boxes, please refer to the electronic service information system (ELSA).



Onboard power supply

Battery master / isolation rely E74

Battery isolation

In a crash, the battery is isolated from the starter lead via the battery master switch. This prevents a short circuit in the starter lead which could lead to a fire.

The isolation signal is received by the battery master switch from the airbag control unit J234 via a separate signal wire.

Recognition of isolation

If the battery has been isolated, a white cover will be seen in the sight-glass instead of a copper winding. The relay should then be reset using the reset switch, otherwise starting the engine will not be possible.

If the onboard power supply has a twin battery concept, the onboard power supply control unit checks the position of the battery master switch. If the master switch is on, starting the vehicle using the starter battery will be prevented.

Key

A Battery
B Starter motor

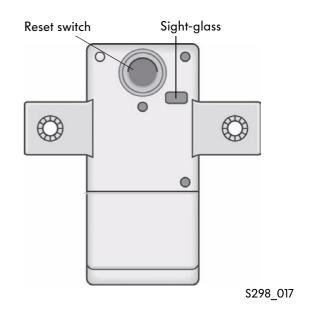
C Alternator

E74 Battery master / isolation switch

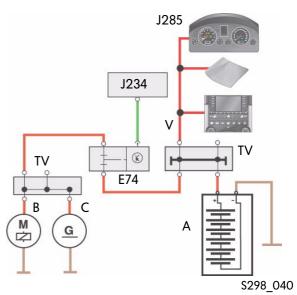
Onboard consumers

J234 Airbag control unit J285 Dash panel insert TV cable distributor

Battery master / isolation switch



Electrical circuit





Before resetting, the starter lead must be checked for short circuits. For this reason, resetting should only be carried out by a specialist workshop.

The electrically folding towing device

Trailer recognition control unit

In addition to normal actuation of the lights on the trailer, the control unit also controls activation of the folding tow hitch.

Operation is via the control buttons in the interior.

The tow hitch is unfolded by an electric motor with a Hall sender and the procedure is monitored by the control unit. If the tow hitch encounters an obstacle, the unfolding procedure is stopped. For this purpose, the control unit monitors the power drawn by the motor. If the control button is actuated repeatedly, the unfolding procedure can be continued.

Conditions for switching off

The following conditions could lead to the folding procedure being stopped:

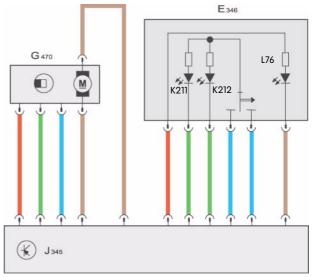
- Overload recognition as protection against entrapment
- The folding procedure will be stopped if there is a change in the power supply, i.e. if the voltage drops below 9 Volt or rises above 15 Volt for more than 300 ms
- Change in the conditions that permit activation

Activation conditions

- Terminal 15 off
- Terminal 15 on and road speed 0 km/h and engine off



Electrical circuit



S298_041

Key

J345 Trailer detection control unit

G470 Tow bar coupling motor Hall sender

E474 Button for electrically folding tow hitch

K211 Tow hitch folding out warning lamp

K212 Tow hitch folding in warning lamp

L76 Switch illumination

Battery concept

The equipment with batteries

Overview

The Volkswagen Touareg can be fitted with different battery systems.

The following derivatives are possible:

- Single battery electrical system
- Single battery electrical system with second battery to supply additional water heater
- Twin battery electrical system for V10 TDI engine



Vehicles with a single battery electrical system draw the power required for the onboard power supply and the starter from this one battery.

Single battery electrical system



Single battery electrical system with additional battery

The second battery supplies the additional water heater with power and is charged when the engine is running via a charging circuit relay.



Dual battery electrical system

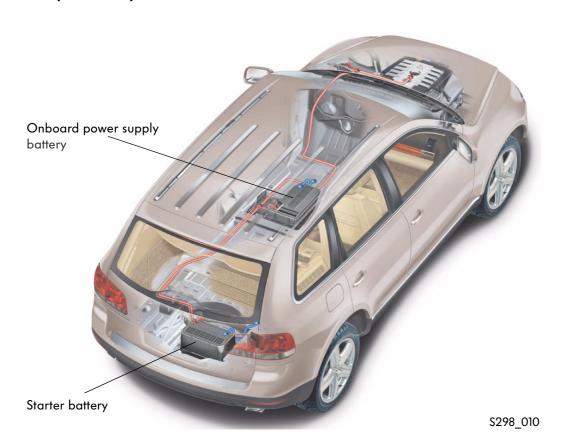
To ensure that the power required for starting is always available on vehicles with V10 TDI engines, a twin battery electrical system is fitted.

In this electrical system, one battery, the starter battery, has the role of supplying the starter with power and, if necessary, also the electrical consumers required for the starting procedure (start-up consumers). The second battery, the onboard power supply battery, provides the rest of the electrical consumers with power.

The batteries are switched in parallel to provide the necessary current to start the V10 TDI engine.



Dual battery electrical system



Battery concept

Dual battery electrical system

Onboard power supply structure of twin battery electrical system

To prevent the starter battery from becoming discharged by electrical consumers, the consumers are split into two categories:

- Start-up consumers
 (e.g. glow plug system, engine control unit)
- Onboard consumers
 (e.g. radio, heated rear window)

The start-up consumers and the remaining electrical consumers are supplied from the onboard power supply battery.

Via the relay for start-up consumers, these can be supplied from the starter battery. Consumers that require a large amount of energy, such as the glow plugs on diesel engines, are always supplied from the starter battery.

In addition, both batteries can be connected via the additional/starter battery charger relay to charge the starter battery.

The actuation of the relays comes from the onboard power supply control unit. It monitors the voltage of both batteries when the vehicle is in motion and can thus detect when the starter battery needs recharging.

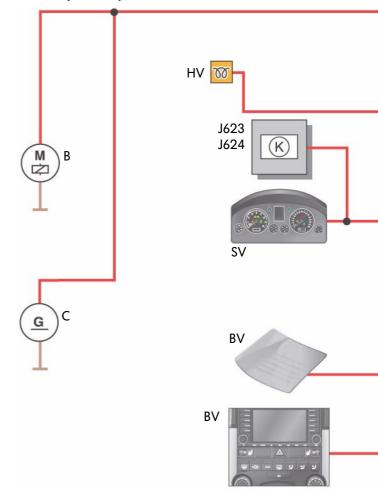
Stand-by

The system is on stand-by when the onboard power supply control unit is in sleep mode (terminal S not active).

If on stand-by, relay 1 for voltage supply J701 and second/starter battery charging circuit relay J713 are open.

Relay 2 for voltage supply J710 is closed.

Stand-by switch position



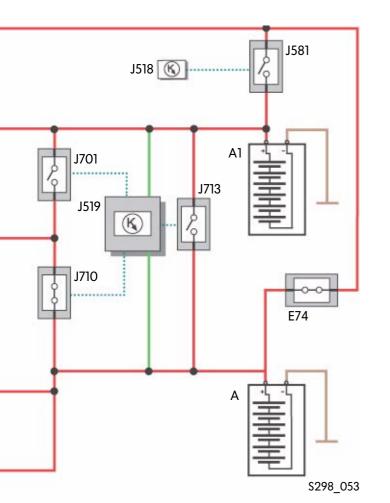


Starting procedures

When the ignition is switched on, the onboard power supply control unit J519 is activated (wake-up mode) and evaluates the charge status of the batteries. If the voltage reading of the onboard power supply battery is below 10.5 Volt, it is deemed to be discharged. The starter battery is deemed to be discharged if the voltage reading is below 11.5 Volt.

There are four different conditions that can be detected before the engine is started depending on the charge status of the batteries:

- Onboard power supply and starter battery charged
- Onboard power supply battery discharged, starter battery charged
- Onboard power supply battery charged, starter battery discharged
- Onboard power supply and starter battery discharged



Key

- Α Onboard power supply battery, battery A1 Additional battery, starter battery В Starter C Alternator E74 Battery master / isolation switch J518 Entry and start authorisation control unit J519 Onboard power supply control unit J581 Relay for parallel switching of batteries
- J623 Engine control unit J624 Engine control unit 2 J701 Voltage supply relay 1 J710 Voltage supply relay 2
- J713 Charger relay for additional and starter battery
- BV Onboard power supply consumers
- SV Start-up consumers
- HV HT consumers

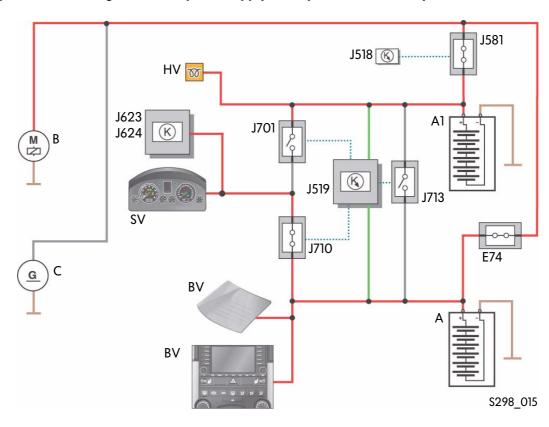
Battery concept

Start procedure with charged onboard power supply battery and starter battery

Start-up is in the normal relay switch position (stand-by). The charging circuit relay for the additional and starter battery J713 and voltage supply relay 1 J701 are open. Voltage supply relay 2 J710 is closed. The battery parallel circuit relay J581 is activated by the entry and start authorisation control unit in the same way as terminal 50.



Switch position with charged onboard power supply battery and starter battery



Key

Α	Onboard power supply battery, battery
A1	Additional battery, starter battery
_	0

B Starter
C Alternator

E74 Battery master / isolation switch

J518 Entry and start authorisation control unit

J519 Onboard power supply control unit J581 Battery parallel circuit relay

J623 Engine control unit

J624 Engine control unit 2

J701 Voltage supply relay

J710 Voltage supply relay 2

J713 Charging circuit relay for additional battery (starter battery)

BV Onboard consumers

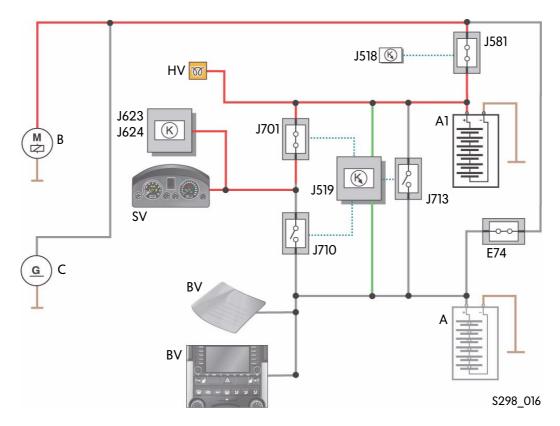
SV Start-up consumers

HV HT consumers

Start procedure with discharged onboard power supply battery and charged starter battery

The start-up consumers are switched from the onboard power supply battery to the starter battery. To prevent voltage compensations between the two batteries, voltage supply relay 2 J710 is opened first and after about 100 milliseconds, voltage supply relay 1 J701 is closed. The second battery charging circuit relay J713 remains open. In this case, the vehicle cannot be opened using the radio remote control. Because the onboard power supply control unit detects a discharged onboard power supply battery when the ignition is switched on, an emergency start is activated.

Switch position with discharged onboard power supply battery and charged starter battery



The information is sent to the dash panel insert and the control unit for entry and start authorisation via the emergency mode cable connection. In the display of the dash panel insert, the warning message "Please start engine" will then be shown. If the onboard power supply control unit detects that the alternator is charging the batteries when the engine is running, the onboard consumers will be switched to the onboard power supply battery. The emergency start procedure is then complete. Only now, using the automatic gearbox selector lever, is it possible to select a gear and drive the vehicle. If the ESP warning lamp lights up, it will go out after the vehicle is set in motion when the steering angle sensor is rematched. Glow plug operation is inhibited, the glow plug system warning lamp will flash.

Battery concept

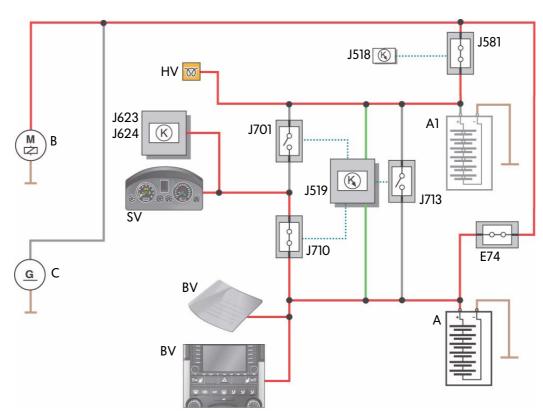
Start procedure with charged onboard power supply battery and discharged starter battery

The relay is in the same switch position as with starting procedures when both batteries are charged.

The charging circuit relay for the additional and starter battery J713 and voltage supply relay 1 J701 are open. Voltage supply relay 2 J710 is closed.



Switch position with charged onboard power supply battery and discharged starter battery



Key

Α	Onboard	power	supply	battery,	battery
---	---------	-------	--------	----------	---------

Al Second battery, starter battery

B Starter

C Alternator

E74 Battery master / isolation switch

J518 Entry and start authorisation control unit

J519 Onboard power supply control unit

J581 Battery parallel circuit relay

J623 Engine control unit

J624 Engine control unit 2

J701 Voltage supply relay 1

J710 Voltage supply relay 2

J713 Second battery charging circuit relay

(starter battery)

BV Onboard consumers

SV Start-up consumers

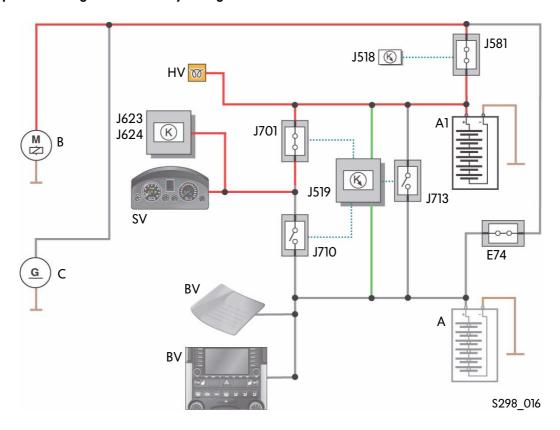
HV HT consumers

Starting procedure with weak starter battery and onboard power supply battery

If the voltage of the onboard power supply battery is less than 10.5 Volt and the voltage of the starter battery is less than 11.5 Volt, the voltage of both batteries is calculated following activation of the onboard power supply control unit wake-up mode.

If during this calculation, the starter battery voltage is found to be greater than that of the onboard power supply battery, the start procedure for discharged onboard power supply battery is selected. If the onboard power supply battery has the greater voltage reading, the start procedure is actuated without change in the relay switch position.

Switch position at high starter battery voltage



Key

- A Onboard power supply battery, battery
- A1 Second battery, starter battery
- B Starter
- C Alternator
- E74 Battery master / isolation switch
- J518 Entry and start authorisation control unit
- J519 Onboard power supply control unit
- J581 Battery parallel circuit relay
- J623 Engine control unit

- J624 Engine control unit 2
- J701 Voltage supply relay 1
- J710 Voltage supply relay 2
- J713 Second battery charging circuit relay
 - (starter battery)
- BV Onboard consumers
- SV Start-up consumers
- HV HT consumers



Power supply

Alternator

Drive layout

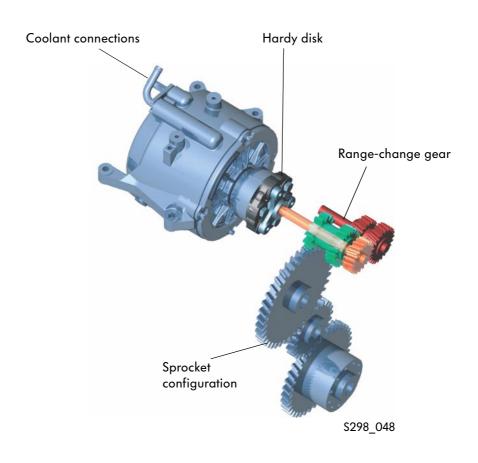
The drive layout of the alternator on the V10 TDI engine consists of a sprocket configuration, a range-change gear with a ratio of 3.6:1 and a Hardy disk.

The range-change gear increases the working speed of the alternator, which thereby improves performance. This is necessary to provide the large amount of voltage required by the electrical system, even at idling speed.

The alternator is cooled via the engine cooling circuit to protect it against overheating, which in turns ensures improved longevity and efficiency.



Alternator



Charging

Charging of the starter and onboard power supply battery

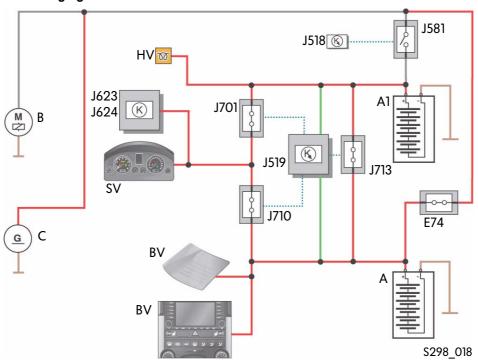
The onboard power supply battery is charged continuously. The starter battery is charged via the second battery/starter battery charging circuit relay J713. This is actuated by the onboard power supply control unit J519. The normal charging time is 20 minutes. After this period the relay will open. If the starter battery voltage drops below 12.8 Volt, a new charging cycle of 20 minutes maximum is started. While the glow plugs are active, the relay stays closed.

If voltage supply relay 1 J701 does not open after the engine has been started because the contacts are sticking for example, the charging circuit relay J713 will close after four minutes until the ignition is switched off.

The onboard power supply derives its power from both batteries which are connected in parallel and protected against overload by relay J701.



Switch position for charging



Key

- A Onboard power supply battery, battery
- Al Second battery, starter battery
- B Starter
- C Alternator
- E74 Battery master / isolation switch
- J518 Entry and start authorisation control unit
- J519 Onboard power supply control unit
- J581 Battery parallel circuit relay
- J623 Engine control unit

- J624 Engine control unit 2
- J701 Voltage supply relay 1
- J710 Voltage supply relay 2
- J713 Second battery charging circuit relay
 - (starter battery)
- BV Onboard consumers
- SV Start-up consumers
- HV HT consumers

Onboard power supply management

The onboard power supply control unit J519

Functions of onboard power supply control unit

Until now control units and relays functioned at different locations in the vehicle. In the onboard power supply control unit, these functions are now localised.

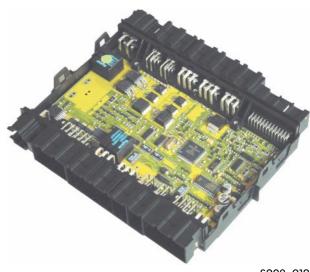
The onboard power supply control unit in the Touareg is responsible for the following functions:

- Load management
- Parking light
- Dipped beam headlights
- Side lights
- Turn signals (not in exterior mirrors)
- Main beam headlights
- Additional main beam headlights
- Fog lights
- Footwell lights
- Terminal 58d
- Indicator lamp for hazard warning lights
- Relay for headlight washer system
- Fuel pump priming action
- Horn
- Twin washer pump
- Interior lights
- Rain and light sensor voltage supply

Furthermore, the following switches and signals are processed and sent via the CAN bus to other control units.

- Bonnet contact switch
- Exterior mirror adjustment switch
- Hazard warning lights button
- Light switch
- Voltage supply at starter and onboard power supply battery

Onboard power supply control unit



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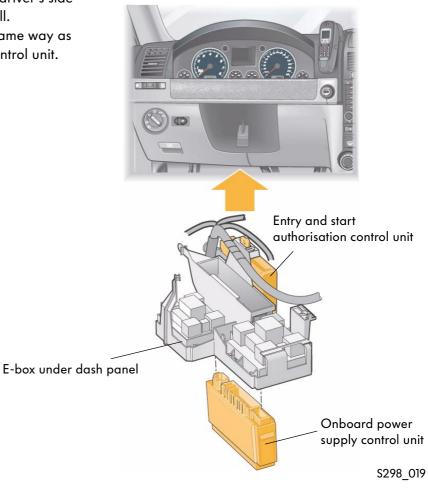


Fitting location

The onboard power supply control unit can be found in the vehicle interior on the driver's side under the dash panel in the footwell.

It is connected to the E-box in the same way as the entry and start authorisation control unit.

Fitting location of onboard power supply control unit and entry and start authorisation control unit





Load management

Furthermore, the onboard power supply control unit deactivates convenience system consumers and long-term HT consumers e.g. heated rear windscreen, so that heavy discharging of the battery is avoided. If the onboard power supply is placed too much under load, the idling speed is also increased. This ensures that there is always sufficient energy to start the engine. Switching off is inline with the guidelines for the Volkswagen Phaeton and is described in Self-Study Programme 272.

Onboard power supply management

Priming function of electrical fuel pump

The petrol engines of the Volkswagen Touareg all feature a priming function of the fuel pump so that enough pressure in the fuel lines can be built up.

Function:

When the driver's door is opened and terminal 15 is closed, a signal is sent via the CAN bus from the entry and start authorisation control unit J518 (terminal 15 off), a signal is also sent from the driver's door control unit J386 (driver's door opened) and, for reasons of safety, a discreet signal (status of terminal 15) is sent to the onboard power supply control unit J519. This then actuates the relay to prime the fuel pump for approx. 2 seconds. The priming function of the fuel pump is stopped when the ignition is switched on. Continued actuation is done through the engine control unit.

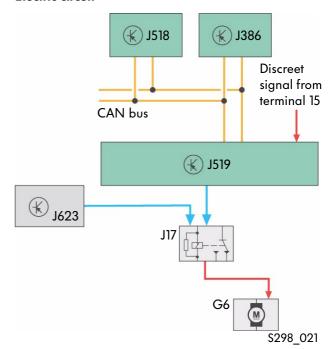
If the driver's door stays open, the actuation is repeated a maximum of three times in intervals.

Timed actuation from the onboard power supply control unit prevents continued actuation of the fuel pump if the driver's door is opened and closed a number of times in short intervals.

Crash shut-off

If with the ignition switched on a crash is detected, a signal is sent from the airbag control unit J234 via the CAN bus and the fuel pump is switched off immediately. After about 5 seconds it can be activated again by switching the ignition off and on.

Electric circuit



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G6 Fuel pump

J17 Fuel pump relay

J386 Driver's door control unit

J518 Entry and start authorisation control unit J519 Onboard power supply control unit

J623 Engine control unit



Interior light actuation

The interior lighting is actuated by the onboard power supply control unit. The voltage supply comes from terminal 30G.

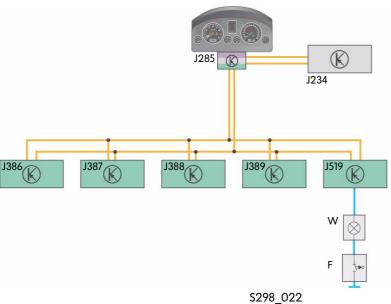
To prevent discharge of the vehicle battery when the interior lights are switched on, power supply from terminal 30G is interrupted in the following circumstances:

- the ignition is switched off,
- the vehicle is locked from the outside and all doors are locked.

Terminal 30G is activated under the following circumstances:

- the interior light switch is actuated,
- the ignition is switched on,
- the vehicle is unlocked, a door, the bonnet or the tailgate is opened,
- the bonnet contact switch.

Data transfer





Interior light switch J234 Airbag control unit Dash panel insert (Gateway) J285 J386 Driver door control unit J387 Front passenger door control unit J388 Rear left door control unit J389 Rear right door control unit J519 Onboard power supply control unit Interior lights



If a crash is detected, the interior light is switched on immediately. After the ignition is switched on and off and after is has been switched on again, the cut-off function from terminal 30G is reactivated.

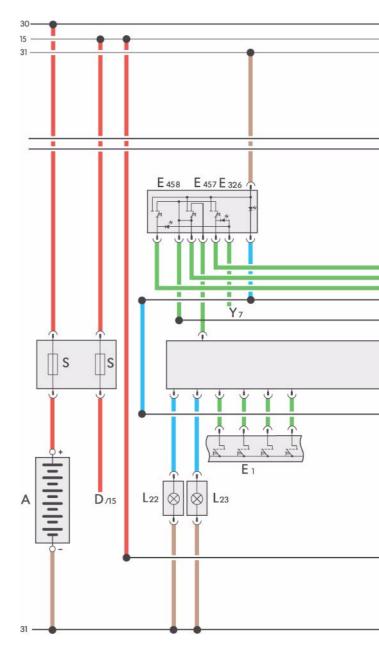


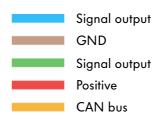
Onboard power supply management

The function layout

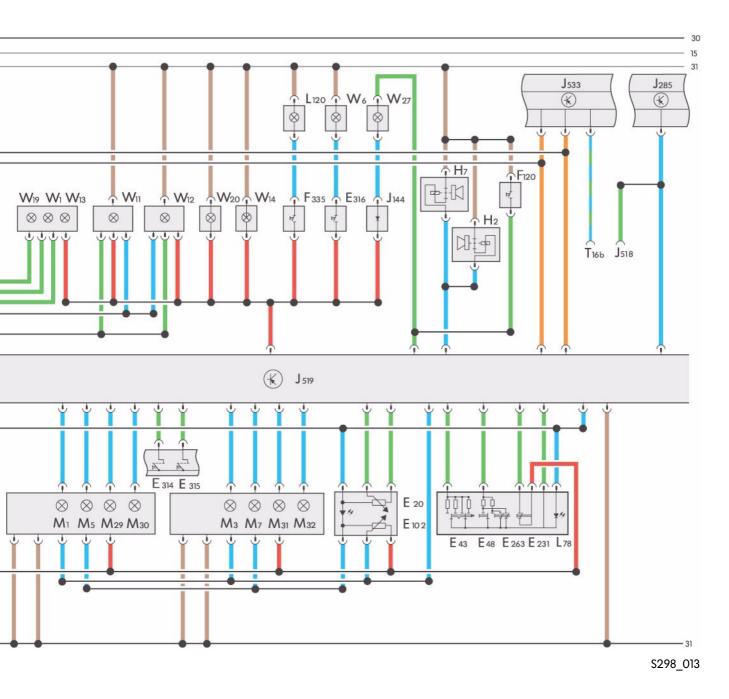
Key

- A Battery
- D Ignition switch
- E1 Light switch
- E3 Hazard warning light switch
- E20 Light regulator for lighting switches and instruments
- E43 Exterior mirror adjustment switch
- E48 Mirror adjustment change-over switch
- E102 Headlight range control adjuster
- E231 Exterior mirror heating button
- E263 Mirror fold system switch
- E314 Rear fog light button
- E315 Fog light button
- E316 Glove box button
- E326 Interior light button, front
- E457 Driver reading light button
- E458 Front passenger reading light button
- F120 Anti-theft alarm/
 - vermin repellent system contact switch
- F335 Stowage compartment illumination switch
- G213 Rain sensor
- H2 High tone horn
- H7 Low tone horn
- J39 Relay for headlight washer system
- J144 Interior light switch-off delay blocking diode Interior lighting
- M1 Side light bulb, left
- M3 Side light bulb, right
- M5 Turn signal bulb, front left
- M7 Turn signal bulb, front right
- M29 Dipped beam bulb, left
- M30 Main beam bulb, left
- M31 Dipped beam bulb, right
- M32 Main beam bulb, right
- U1 Cigarette lighter
- U9 Cigarette lighter, rear







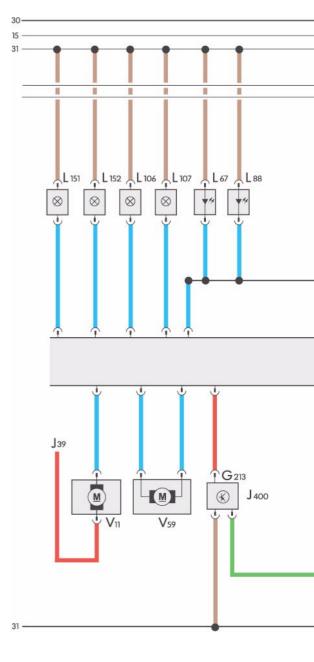


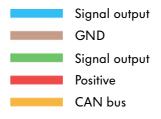
Onboard power supply management

The function layout

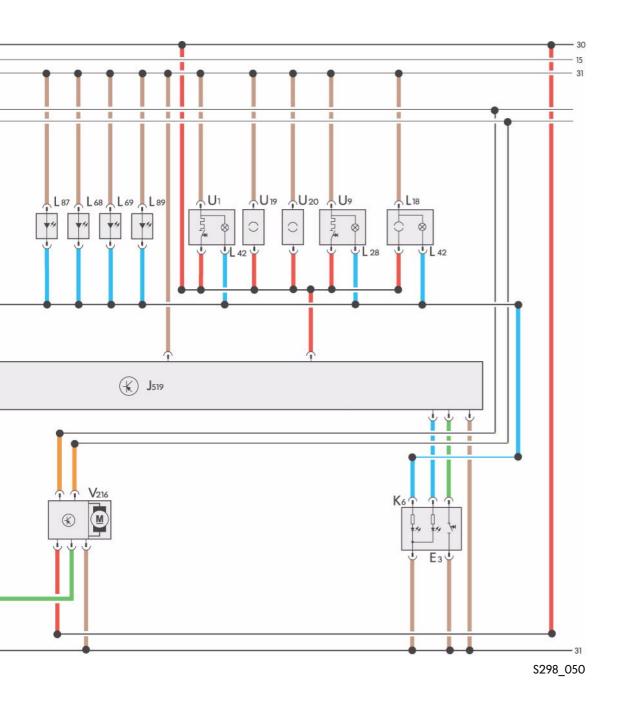
Key

- J285 Control unit with display in dash panel insert
- J400 Wiper motor control unit
- J518 Entry and start authorisation control unit Start authorisation
- J519 Control unit for onboard power supply
- J533 Diagnosis interface for data bus
- K6 Hazard warning light system warning lamp
- L22 Foglight bulb, left
- L23 Foglight bulb, right
- L28 Cigarette lighter light bulb
- L42 Socket light bulb
- L67 Dash panel left vent illumination
- L68 Dash panel central vent illumination
- L69 Dash panel right vent illumination
- L78 Mirror adjustment switch illumination
- L87 Central rear vent illumination
- L88 Rear left vent illumination
- L89 Rear right vent illumination
- L106 Footwell illumination, rear left
- L107 Footwell illumination, rear right
- L120 Shelf illumination
- L151 Front left footwell illumination
- L152 Front right footwell illumination
- U19 12 V socket -3-
- U20 12 V socket -4-
- V11 Headlight washer system pump
- V59 Windscreen and rear window washer pump
- V Windscreen washer motor
- W1 Front interior light
- W11 Reading lamp, rear left
- W12 Reading lamp, rear right
- W13 Front passenger reading light
- W14 Illuminated vanity mirror (front passenger side)
- W19 Reading lamp, driver side
- W20 Illuminated vanity mirror
 - (driver side)
- Y7 Automatic anti-dazzle interior mirror









Lighting

The headlights

Main headlights

The basic equipment comprises a DE headlight with H7 halogen bulb and a H9 halogen bulb for main beam.

Headlights without additional main beam





The "M" equipment level features bi-xenon headlights for main and dipped beam and additional DE headlights with H7 bulbs for main beam. On this version, only the headlights for additional main beam flash when the flasher unit is actuated and the dipped beam is not switched on. A brief actuation of the xenon lamps, e.g. when flashing lights as a signal, shortens their useful life. The turn signals are cool blue in appearance but flash yellow when they are switched on.

Headlight with additional main beam



The rear light

For the rear lighting of the vehicle, rear light clusters with bulbs are used. The rear light clusters are split into two parts.

One part is fixed to the sidewall and the second part can be found on the tailgate.

Rear light cluster



Vehicle at normal level



S298_042

Vehicle raised



S298_034

Rear fog light

Due to the Touareg's off-road capability, the adaptive suspension of the vehicle allows greater changes in vehicle height than on normal automobiles. Government regulations require, in Japan for example, that the rear fog light is switched off when the vehicle is in the highest position.

This function is available for other countries as a code in the onboard power supply control unit.



Lighting

Surround lighting

The lights integrated in the exterior mirrors illuminate the area around the vehicle.

Conditions for activation:

The lights are actuated simultaneously with:

- the interior lights,
- the coming home/leaving home lighting function.

The surround lights are controlled by the onboard power supply control unit via the CAN bus and actuated by the driver's and front passenger's door control units.

To prevent the surround lights from becoming damaged by long periods of activation, a protection feature is integrated in the onboard power supply control unit which switches off the lights after a prescribed duration to allow them to cool down.

Surround lights





S298_023

The convenience lighting

Lighting settings

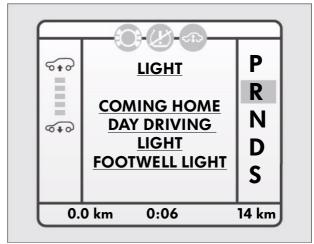
In the set-up menu of the dash panel insert, various adjustments can be made to the lighting:

- Duration of coming-home lighting,
- Day driving light,
- Brightness of footwell lighting.

The duration of the coming-home lighting can be set between 0-90 seconds. After 90 seconds, the lights are switched off automatically to avoid discharging of the battery.

In the set-up menu, the day driving light function can be switched on or off. This option is only available in countries where day driving lights are not a legal requirement.

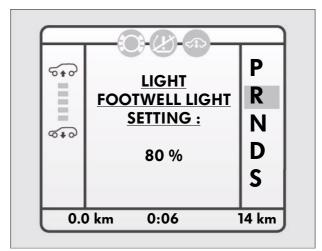
Display in instrument panel insert



S298_031

The footwell lighting can be adjusted from 0 %-100 %.

Display in instrument panel insert



S298_032



The lighting

Functions:

Turn signals

The main function of the turn signals is set in the onboard power supply control unit.

Signal sequence:

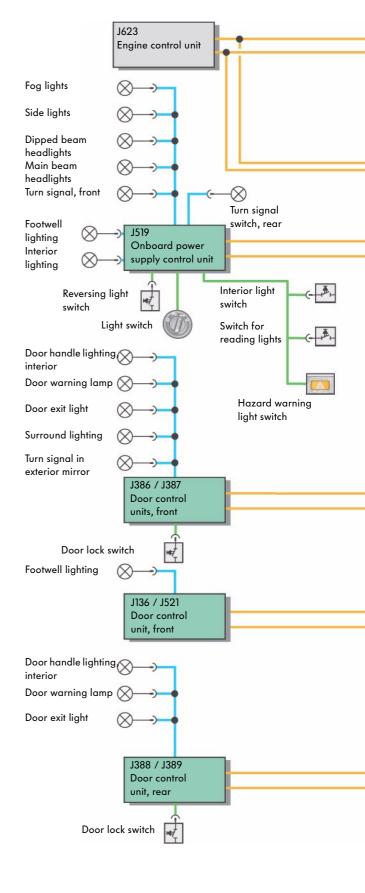
- Turn signal switch
- Steering column electronics control unit
- Onboard power supply control unit (actuation of turn signals)
- Trailer detection control unit (actuation of turn signals on trailer)
- Driver and front passenger door control units (actuation of turn signals in exterior mirrors)
- Dash panel insert (actuation of warning lights and display of warning messages)

Side lights

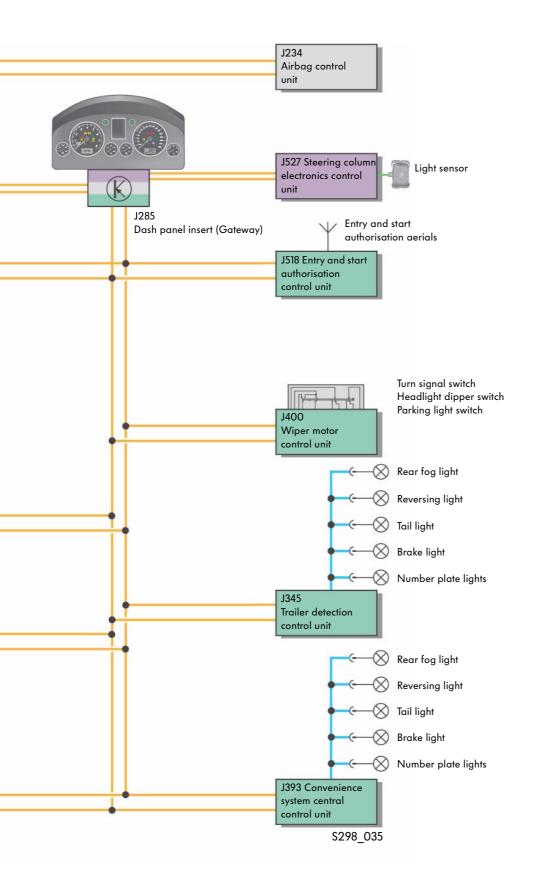
The main function of the side lights is also set in the onboard power supply control unit.

Signal sequence:

- Light switch
- Onboard power supply control unit (actuation of front lights)
- Convenience system central control unit (actuation of rear lights)
- Trailer detection control unit (actuation of turn signals on trailer)
- Dash panel insert (actuation of warning lights and display of warning messages)







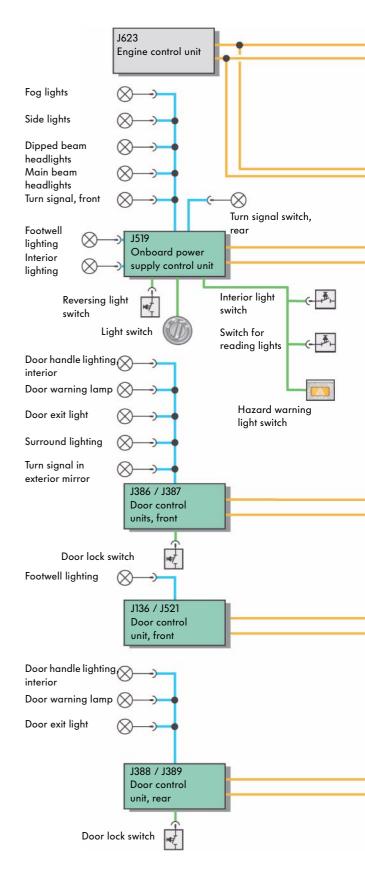
Driving lights

The main function of the driving lights is also set in the onboard power supply control unit.

Signal sequence:

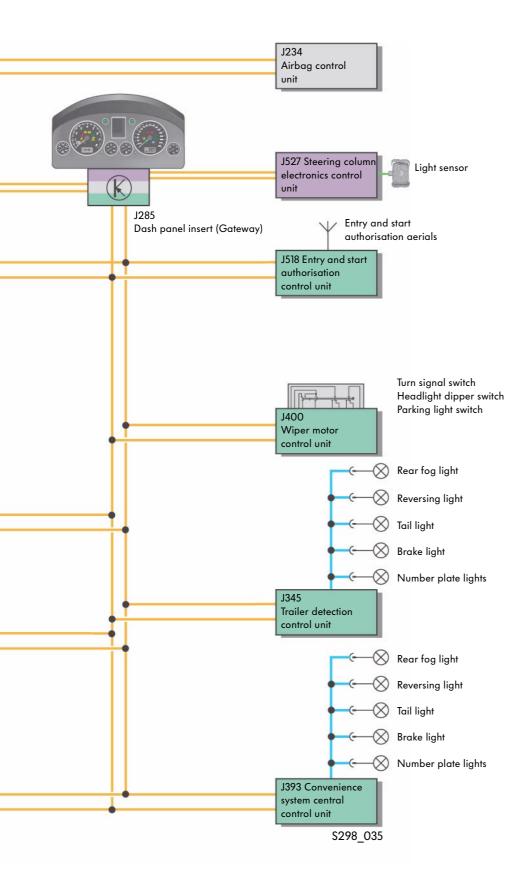
- Light switch
- Onboard power supply control unit (actuation of headlights)
- Dash panel insert (actuation of warning lights and display of warning messages)

An additional switching option in the onboard power supply control unit permits activation of the headlights if the onboard power supply control unit should fail or the side light and dipped beam light switches should cease to function.









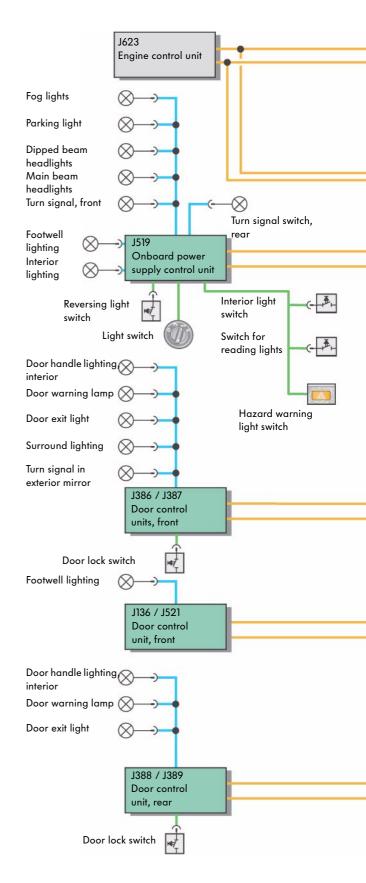
Automatic driving light control

The automatic driving light control is set in the onboard power supply control unit as normal.

Signal sequence:

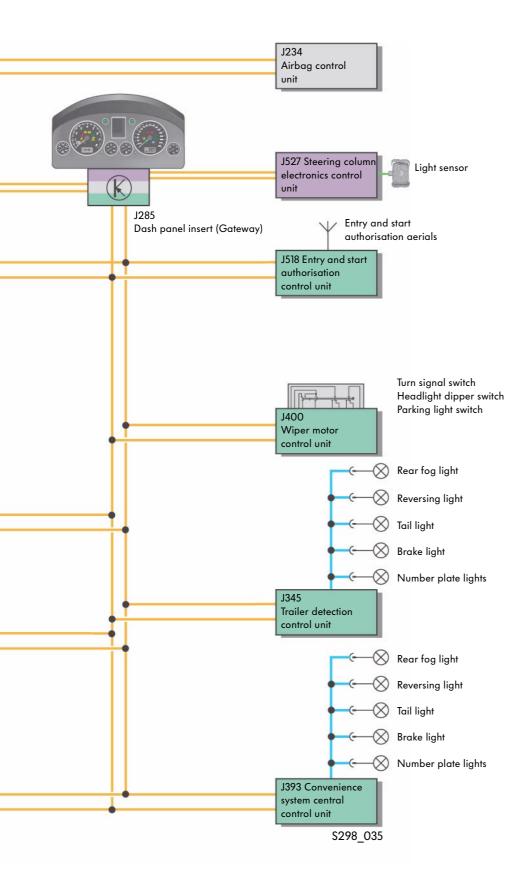
- Light switch in automatic driving light position
- Input signal from light sensor via wiper motor control unit, Infotainment and Gateway CAN bus
- Onboard power supply control unit (actuation of front lights)
- Convenience system central control unit (actuation of rear lights)
- Trailer detection control unit (actuation of turn signals on trailer)
- Dash panel insert (actuation of warning lights and display of warning messages)

The automatic driving light control is only active when the light switch is in the relevant position.









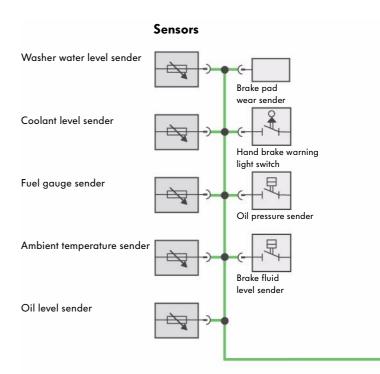
Driver information

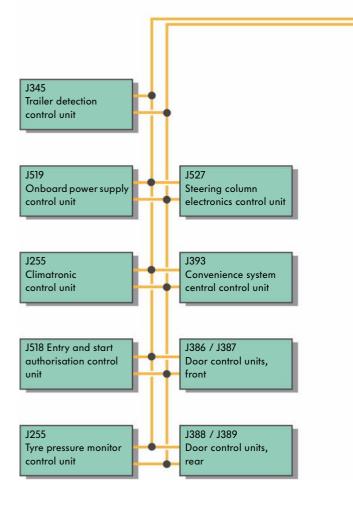
Function:

The warning lights and instruments in the dash panel insert receive their information from the control units via the CAN bus or discreet wiring from their own sensors.

Signals that are sent via the CAN bus from the control units make their way to the processor in the dash panel insert via the Gateway.

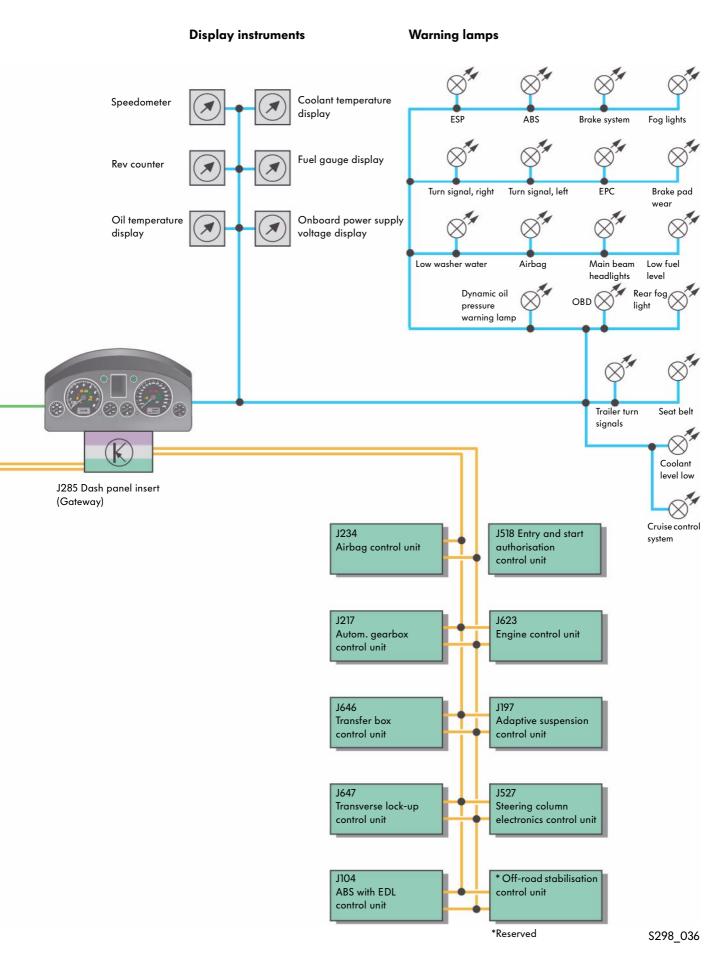
The control units can be adapted in the Gateway using the vehicle diagnosis system VAS 5051. If the control units are not adapted, the warning lights and instruments cannot be actuated.











Entry and start authorisation

Function:

Central locking in general

The central locking of the vehicle is controlled by the convenience system central control unit. The doors and the tailgate are locked. The lock positions of the doors are unlocked, lokked and secured or not secured. In the tailgate the lock positions are locked and unlocked.

If the vehicle is locked and secured, the LEDs in the driver and front passenger doors will be actuated. Actuation lasts for about 5 seconds and is controlled by the convenience system central control unit. Thereafter it is controlled by the door control units.

If the convenience system central control unit should fail, the driver's door control unit will take over in emergency operation mode. A difference in operation cannot be detected.

Interior light, driver Interior light, front Interior light, rear Interior light, rear left Interior light, rear right Onboard power supply control unit Turn signal, Turn signal, front left front right Turn signal, Turn signal, rear right rear right Child safety lock, Exterior door handle rear left button Child safety lock, Interior door handle rear right button Fuel tank flap Touch sensor J386 Exterior mirror turn signals Door control unit, driver side Locking motors

Input signals as

door control unit

1388

Look / unlook

warning light

rear left

with front passenger

Door control unit,

Locking motors

Interior light, front

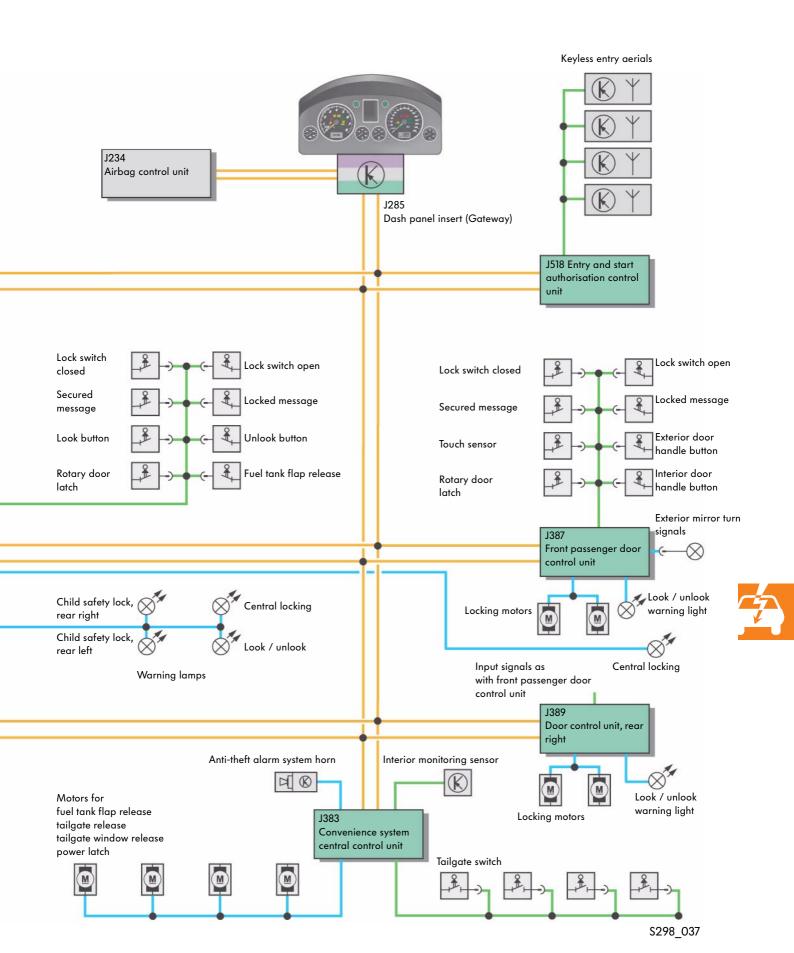


Operation via radio remote control

The information from the radio remote control is received by the aerial of the entry and start authorisation control unit.

The entry and start authorisation control unit passes the information on via the convenience CAN bus to the convenience system central control unit. This is turn actuates the door control units.





Operation via proximity sensors

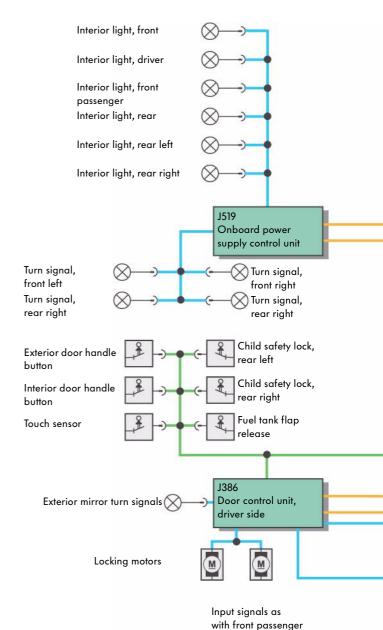
Apart from opening the door, no other action is necessary. The entry and start authorisation control unit detects the transponder in the ignition key. When the door handle is actuated, the action is detected by the entry and start authorisation control unit by means of a signal. A signal is then also sent via the convenience CAN bus to the convenience system central control unit. This actuates the relevant door control unit.

Activating and deactivating the anti-theft alarm system

The anti-theft alarm system is activated in positions locked or secured.

If the ignition is switched on, the anti-theft alarm system cannot be activated.

An active anti-theft alarm system is displayed by the central locking warning lights in the front doors for a maximum of 28 days.



door control unit

Door control unit, rear left

Locking motors

J388

Look / unlook warning light



S298_037

Service

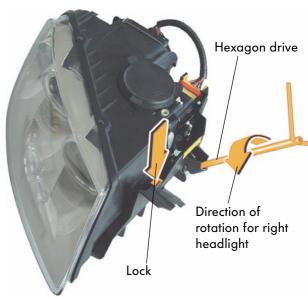
The lighting

Removing headlights

The headlights are designed based on the principle of sliding drawers. They can be pulled out. To do this, a socket must be used on a hexagon drive to unscrew the headlights. This releases the lock and the headlight can be removed.

The direction of rotation differs on the left and right.

Headlights with safety locks



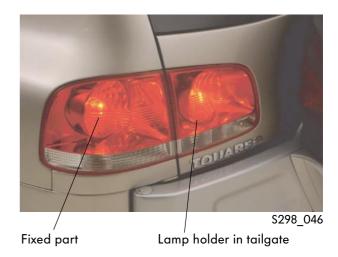
S298_030

Rear lights

On the fixed part of the rear light cluster, the lamp must be removed to replace the bulb.

The bulbs of the rear light in the tailgate can be replaced by changing the lamp holder.

Rear lights





Diagnosis

Guided fault finding

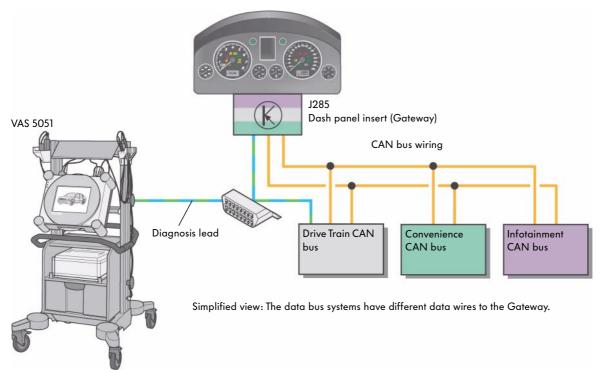
The data from the guided fault finding function is interrogated by the vehicle diagnosis, testing and information system VAS 5051.

To do this, the guided fault finding function must be selected. All the necessary information can be found there.

The data is interrogated via a diagnosis interface for the data bus in the dash panel insert.

A wired communication connection is only necessary to some control units in the drive train CAN bus, to control units for gas discharge lamps and to the convenience system central control unit.

Signal sequence



3-W-c

S298_047

Glossary

CAN bus

Bi-directional data wire between control units. The data can be sent in both directions (bi-directional). Data buses work at different rates of data transfer. 500 kBit/s means that 500 000 binary figures, that is 0 or 1, can be sent per second.

Discreet signal

This is a voltage signal which is sent via a normal cable.

Gateway

This is a data interface (connection), which allows different data signals to be sent from one CAN bus to another.





Test yourself

1.	W	hich control units belong to the Drive Train CAN bus?
	a)	The airbag control unit, the convenience system central control unit, the tyre pressure monitor control unit.
	b)	The steering column electronics control unit, the entry and start authorisation control unit, the engine control unit, the airbag control unit.
	c)	The wiper motor control unit, the door control units, the rear blind control unit, the airbag control unit.
2.	w	here can the battery main / isolation switch E 74 be found?
	a)	In the luggage compartment, next to the starter battery.
	b)	In the engine compartment, near the alternator.
	c)	In the back-up fuse box, under the driver's seat.
3.	If t	the voltage of the onboard power supply battery is below 11.2 Volt,
	a)	it is discharged.
	b)	it is weak, but not discharged.
	c)	the alternator is defective and must be replaced.



4.	Wł	nich functions are controlled by the onboard power supply?
	a)	The parking light, fog lamps, twin washer pump.
	b)	The brake lights, the rear turn signals, the power latch function in the tailgate.
	c)	The wiper motor, the central locking, the sliding/tilting sunroof.
5.	W	hich lighting settings can be carried out in the set-up menu of the dash panel insert?
	a)	Change in the flash frequency of the turn signals.
	b)	Day driving light in countries where there is no legal requirement for them to be on permanently.
	c)	The brightness of the footwell lighting.
6.	W	hich control units play a role in the "Automatic driving light" function?
	a)	The onboard power supply control unit, the wiper motor control unit, the convenience system central control unit.
	b)	The steering column electronics control unit, the onboard power supply control unit, the trailer detection control unit.
	c)	The entry and start authorisation control unit, the onboard power supply control unit, the convenience lighting control unit.





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